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THE EARLY HISTORY OF FELT

By BERTHOLD LAUFER

THE art of making felt by rolling, beating, and pressing animal hair or flocks of wool into a compact mass of even consistency is assuredly older than the art of spinning and weaving. In point of time, felted stuffs followed immediately, or originated contemporaneously with, the custom of using animal skins or furs as garments. Felting was practised in times of great antiquity both in Asia and Europe, but it was restricted to these two continents. It is noteworthy that it has always been absent in Africa. Even in ancient Egypt where sheep were reared and their wool woven into cloth felt was unknown. It did not exist either in aboriginal America. The ancient Peruvians, although they had domesticated the llama and alpaca, did not conceive the notion of felt.

There are ancient records extant that give references to felt in Chinese, Greek, and Latin literatures. We must not imagine, however, that for this reason the Chinese, Greeks, and Romans were the first nations to have made use of felt. The Greeks lived in proximity to the roving Scythians of southern Russia; and the vast steppes stretching east of the Ural and the Caspian sea across Russian and Chinese Turkestan into southern Siberia and Mongolia were, from earliest times, the playground of ever moving tribes, restless like the waves of the oceans, of Iranian, Turkish, Mongol, and Tungusian nationalities. These tribesmen of nomadic habits subsisted on the wealth of their flocks consisting of cattle, camels, sheep, goats, and horses. The making of felt naturally presupposes the existence of wool-furnishing domestic animals like sheep, goat, and camel. While it is true that felt can be made and has been made from the hair of wild animals, the supply of such hair is not plentiful enough to establish the industry on a large scale. It is therefore clear that solely peoples who possess a large stock of herds of wool-bearing sheep and camels could call into life

a flourishing felt industry. This reason alone, however, would hardly be sufficient to ascribe the invention of felt to the nomadic population of Asia and to disclaim it for the Chinese and the Greeks; the two latter nations also had domesticated sheep, and the Greeks manufactured sheep-wool into garments. The ancient Chinese, although they had sheep, never utilized its wool for clothing. The Chinese, as well as the Greeks and Romans, assuredly understood the preparation of felt, and the Chinese still prepare it, but the manufacture of this article had a limited importance among them. Eliminate felt from Chinese, Greek, and Roman civilizations, and they would still remain what they are, not being in the least affected by this minus. Eliminate the same element from the life of the nomadic populations, and they would cease to exist, they would never have come into existence. With these peoples felt is a fundamental of culture, an absolutely essential feature and necessity of life, while with the highly civilized nations like the Chinese, Indians, Greeks, and Romans it is a side issue, an incident, an element of occasional and minor importance.

The use of felt, therefore, has reached its maximum intensity and its climax among the nomadic tribes of Asia, and this is the principal reason why we are compelled to attribute the invention of felt, both the initiative and the perfection of the process, to the Asiatic nomads. This means, of course, that the Chinese, the Indians, and the Greeks learned the art from the latter, while the Romans adopted matter and word from their masters, the Greeks. Another interesting point of difference is that to the civilized nations felt was simply a utilitarian product which they adopted because it was useful and practical, whereas among the nomads it was associated with religious and ceremonial practices. It was part and parcel of their life, inseparable from their inward thoughts. Which of the many hundreds of tribes of inner Asia was the original inventor of felt, it is impossible to ferret out in the present state of our knowledge. The beginnings of the art are lost in the dawn of human civilization. Neither the ancient Scythian nor the ancient Turkish tribes had any system of writing so that no records of their earliest history are preserved in their own languages; for all that we know about them we are indebted to the records of the Chinese and the Greeks. Archaeology, to some extent, comes to our rescue, for some ancient remains of felt have been discovered in Central Asia. More than that, the ancient mode of life of the Turkish, Mongol, and Tibetan tribes is still preserved in full vigor: they still manufacture felt as their ancestors did thousands of years ago, they still utilize it for exactly the same purposes. By combining historical, ethnological, and archaeological methods the ear-

ly history of felt can be reconstructed with a fair degree of accuracy and completeness.

In the light of the preceding remarks it is clear that no credence can be attached to the European legend according to which the invention of felt is ascribed to Saint Clement, who while on a pilgrimage placed carded wool in his shoes to protect his feet, the constant pressure and moisture changing this wool into felt.

No detail of the early process of felting is preserved by any Chinese or Greek author, but there can be no doubt that in principle the ancient process was identical with that prevailing in Asia at the present time. This primitive process is practically the same everywhere. The principal instrument used is a large mat. The wool is spread out on this mat layer upon layer until the desired thickness is secured, the wool for the upper layers being generally of a better quality or finer texture than that in the interior and lower layers. Grease or oil mixed in water serves as size. The mat is rolled up under firm pressure with the feet (some people use the back of the forearm in this process), then it is unrolled and rerolled from the opposite end. This manipulation of rolling forward and backward occupies a considerable time; revolving is continued for four or five hours, when the fibers become firmly and closely intertwisted. The felt is now taken up, washed with soap and water, dried, and again stretched on the mat and dried in the sun. Colored patches of felt or wool are arranged on it in India and Turkestan, and the whole is then again subjected to the rolling process for several hours, when the material is completed and fit for use. In India the finer kinds of felt are trimmed with a mowing-knife, which greatly improves the appearance and brings out the distinctness of the colors.

Felt in China

In the earliest documents of the Chinese, the Book of Songs (*Shi king*) and the Book of History (*Shu king*) no mention is made of felt. It appears in Chinese records toward the end of the Chou dynasty (fourth to third century B.C.), and felt rugs seem to have been used at that time as mattresses to sleep upon. At the outset it is improbable that the Chinese could be regarded as the inventors of felt. They raised sheep, but never utilized their wool for any fabrics. Hemp and other fibrous plants, as well as silk, furnished the staple for clothing. Woolen materials have always been alien to Chinese civilization. There was no cattle-breeding on a large scale, and consumption of milk and any dairy products was unknown. The Chinese were (and still are) essentially a nation of agriculturists. From early times, the north of China was in close contact with central and northern Asia teeming

with a vast pastoral population, for the greater part of Turkish and Tungusian nationality. These ever restless hordes perpetually poured over the Chinese frontiers and raided and pillaged the villages of the farmers. The most dreaded of these predatory foes were the Hiung-nu, as they are styled in the Chinese annals, who have been identified with the Huns. From about 1400 B.C. the Chinese were constantly engaged with them in a life and death struggle. The Chinese armies in the beginning were usually the losers as they opposed their infantry to the mobile cavalry and mounted archers of their enemies. The Hiung-nu, a Turkish tribe, subsisted on cattle, fed upon flesh and milk, and used leather obtained from the skins of their domestic animals as clothing and armor; in addition to leather garments they wore coats or overcoats of felt and lived in tents covered with the same material. It is very probable that the Chinese made their first acquaintance with felt during their long military and diplomatic intercourse with the Hiung-nu which lasted for many centuries. In 307 B.C. Wu-ling, king of the principality Chao, adopted the clothing and the tactics of shooting with the bow on horseback from the nomadic tribes. Chinese garments were spacious, loose, and flowing, and a serious obstacle to riding and shooting, while the costume of the nomads was tight-fitting and equipped with tall boots. There is no doubt that on the occasion of this reform movement in dress also articles of felt and perhaps the manufacture of felt itself were adopted by the Chinese. The country inhabited by the nomads is known to them under the name "the land of felt."

Under the Han dynasty (201 B.C.–A.D. 220) felt was well established in China and used in the form of mats. The Emperor Wen (179–152 B.C.) of this dynasty wore a felt cap on his hunting expeditions. The felt of the nomads is alluded to by the philosopher Huai-nan-tse, who lived in the second century B.C.; his statement implies that in his time felt was still unknown south of the Yangtse region.

At the end of the third century A.D. the use of felt was still regarded as something foreign and barbaric, for it is on record that in the period T'ai-k'ang (A.D. 280–290) when fillets and girdles of felt were introduced as a novel fashion, the people ridiculed this custom and said, "China apparently has been conquered by the nomads (Hu), for felt is a product of the nomads, and now with felt fillets and girdles we adopt their styles."

In A.D. 532 Yüan Siu was placed upon the throne as tenth emperor of the Northern Wei dynasty by Kao Huan, who sent four hundred horsemen to meet him. The future emperor betook himself into a felt tent to don imperial regalia. He was then escorted to the east gate of the palace, and according to an ancient custom of the Toba, one of the northern nomad tribes

from which the Wei dynasty issued, he was lifted by seven men on a piece of black felt; and while seated on it, he bowed toward the west, imploring Heaven. This was an old usage of the nomads of central Asia, and we shall encounter it again among Turks and Mongols.

A certain Liu Ling-ch'u, who lived in the fifth century A.D., is said to have cut human figures out of felt for magical purposes. This idea was doubtless borrowed from the nomads, for it was an ancient Turkish and Mongol custom, more of which will be said below, to fashion religious images from felt and to keep them in leather cases.

A felt cap is referred to in the *Ts'an luan lu*, a diary kept by Fan Ch'eng-ta during his journey from the capital to Kwei-lin in Kwang-si, on his appointment to that prefecture in A.D. 1172.

Not only in the north, but also in the west and southwest were the Chinese surrounded by felt-using nations. The vast area occupied at present by the provinces of Se-ch'wan and Yün-nan was anciently populated by many different aboriginal groups of tribes partially related to the Tibetans, partially to the Siamese (Tai family), and partially of independent stock, prior to the advent of the Chinese. The latter, in the course of several centuries, penetrated those regions, subdued the very warlike aborigines, and colonized the country. Many of the tribes were annihilated, others were pushed back into inhospitable high mountains, still others migrated into Siam and Burma, others survive to this day. The earliest reference to felt in this territory is made in the Annals of the Han Dynasty with reference to a tribe inhabiting Se-ch'wan, called the Jan-mang, who were essentially sheep-breeders and manufactured felt as well as various kinds of woolen stuffs; the Chinese annalist records as a remarkable fact that they understood the art of treating the diseases of sheep.

The present province of Yün-nan was formerly occupied by the powerful kingdom of Nan-chao from which at a later date the present-day Siamese issued. The men of the Nan-chao tribes of Yün-nan wore one-piece blankets of felt in the ninth century (according to the *Man shu*, written by Fan Ch'o about A.D. 860). The same author also relates the curious fact that many men in the country P'iao wore white felt. Now P'iao was situated 75 days' journey south of Yung-ch'ang in Yün-nan and corresponds to Pyū, name of the prominent tribe at Prome, the ancient capital of Burma. Whether felt was at that time manufactured in Burma is not known; it seems more likely that it was imported there from Yün-nan.

An important document bearing on felt is contained in the *Ling wai tai ta*, written by Chou K'ü-fei in A.D. 1148 (ch. 6, p. 12). This work gives a geographical description of the two southern provinces, Kwang-tung and

Kwang-si, as well as many valuable notes on the ethnography of the native inhabitants, their customs, products, and manufactures. The author emphasizes the wealth of sheep in the land of the Southwestern Man as they are called by the Chinese, and says that they produce felt and woolen cloth in great quantity.

> From their chieftains downward to the lowest man there is not one who would not throw over his shoulders a piece of felt. The sole difference between the two classes is that the chieftains wear an embroidered shirt on their skin and don the felt over it, while the common people wear the felt directly over their skin. The felt of northern China is thick and solid; in the south felt pieces are made to a length of over thirty feet and to a width of from sixteen to seventeen feet. These are doubled along their width, and the two ends are sewed together, so that they are from eight to nine feet wide. They take a piece of felt lengthwise and wrap it around their body, fastening it with a belt around their loins. The women follow the same practice. During the daytime they are thus wrapped up; at night they sleep in their felt blankets; whether it rains or the sun shines, whether it is cold or warm, these are never separated from their bodies. In their upper part these blankets are decorated with designs like walnuts. Those which are long and big and yet light in weight are held in the highest esteem, and those manufactured in the country of Ta-li (in Yün-nan) are regarded the best.

What this Chinese author noted some eight hundred years ago still holds good for the majority of aboriginal tribes in Yün-nan and southern China. Most of these, particularly the Lolo and Moso, still wear a blanket or a sort of sleeveless coat made of a single piece of white felt as a protection against chill and rain both in winter and summer. Many authors relate with amazement that they never part with this outfit, even in intensely hot weather.

In 1863 S. Wells Williams (*The Chinese Commercial Guide*, 5th ed., Hongkong, 1863, p. 119) wrote,

> Felt caps are worn by the poor throughout the whole country. They are of various shapes and different degrees of fineness; some are made hollow so that when pulled out, they resemble a double cone. The felt cuttings are collected from the manufacture of druggets, caps, soles of shoes, and leggings, to be boiled down and felted over again.

Felt is still manufactured in China into caps, rain-hats, coats, stockings, shoes, shoe-soles, tablecloths, rugs, and carpet-bags. In Suchow the industry is still very much alive. Boys are fond of felt caps, especially when trimmed with colored silk and provided with ear-muffs of fur. The fishermen on the Great Lake (T'ai Hu) wear large, broad-brimmed felt hats plain or trimmed with black satin (specimens collected by me in Field Museum, Chicago).

The method employed by the Chinese in preparing felt is the same as that used by the Tibetans, Mongols, and Turks, with a single exception: the first step they take is to loosen the wool by means of a large bow by tightening the string and jerking it off in rapid motion. This process is derived from that of treating cotton, and the bow in either case is identical. The layers of wool are heaped up on a bamboo mat and carefully moistened with water sprayed from the mouth in the same manner as our Chinese laundrymen moisten linen. Then the wool is rolled up in the mat which is rolled to and fro, and pressed by means of the feet.

Felt in Tibet

In ancient times felt and hide formed the common material for the clothing of the Tibetans, according to the Chinese Annals of the T'ang Dynasty (A.D. 618-906). Felt was also used in Tibet for plates. Even the kings of Tibet were clad in garments of felt; when Srong-btsan sgam-po, the first king of Tibet known in history, married a Chinese princess in A.D. 641, he adopted, in order to please his refined consort, the cultured manners and customs of China and discarded his felt and fur robes which had to give way to Chinese silk and brocade. The Chinese Annals inform us also that the men of rank in Tibet lived in large felt tents called *fu-lu* (Tibetan *sbra*); this kind of tent served for military purposes, and there were big ones capable of holding several hundred men; they formed a military camp. The pastoral population of Eastern Tibet, however, has always lived in square tents covered with a black cloth densely woven from yak-hair. In this respect and in its quadrangular shape the Tibetan tent contrasts with the Mongol circular felt tents and represents a dwelling-type of its own. This tent of yak-hair stuff goes back to a venerable age, for it is referred to as early as the sixth century in the Annals of the Sui Dynasty with reference to the Tang-hiang (Tangut), a Tibetan tribe living in the vicinity of the Kukunor. The same people, however, as emphasized by the Chinese annalist, held felt in highest esteem and looked upon it as the finest ornament.

In central Tibet all men, even the Dalai Lama, wear a high-crowned, red-fringed felt hat; the women wear a red felt hat in the summer. The felt made by them is praised by a Chinese author of the eighteenth century; it is also worked up, he adds, into boots. In fact, the women of Tibet mostly wear high felt boots. These are of the same shape as the leather boots usually worn by men and reaching up to the knees. These felt boots are trimmed with colored patches, the lower part white, then red and green. Like the leather boots they are lined with woolen cloth, while the soles are always of

leather. The Tibetan boot is devoid of a heel. The Tibetan nomads wear high conical felt hats with a large brim turned downward.

The most interesting object made of felt by the Tibetans is a poncho which consists of a long rectangular strip of felt with a hole in the center to put the head through, and which is used on horseback in rainy weather. Most Tibetans spend the whole day in the saddle. When traveling in Tibet for more than a year, I always carried such a felt poncho with me and found it immensely useful; it was a perfectly safe protection in the most violent rain and snowstorms and completely envelops the horse as well as the rider. Similar rain ponchos are used in Asia Minor.

W. W. Rockhill describes the production of felt in Tibet as follows:

> Its mode of manufacture is extremely simple. The wool, having been first picked over, is spread out a handful at a time on a large piece of felt on the ground, each handful overlapping the preceding one in such a way that a piece of uniform thickness and of whatever size is desired is made. This is rolled up tightly and with much pounding of the closed fist and then unrolled, and this work is kept up for an hour or more; then the roll is soaked in water and the work of rolling, unrolling, kneading, and beating with the closed fist goes on for another hour or two. I was told that a piece of felt had to be kneaded at least 1,000 times before it was ready for use. After the roll has been left to dry for a while it is opened, and by pulling it slightly in different directions the surface is made smooth, and the edges are trimmed with a knife. Sometimes it is bleached. Altogether, Tibetan and Mongol felt is vastly inferior to that made by the Chinese.

Felt in India

Felt appears to have been known in India in ancient times. Nearchus, who accompanied Alexander the Great on his expedition to India and as admiral of his fleet in 325 B.C. discovered a sea route between the Indus and the Euphrates, reports that the inhabitants of India understood the art of felting wool (Strabo XV. 1, 67). It is on record in the Chinese Annals of the T'ang Dynasty that in the beginning of the period T'ien-pao (A. D. 742-756) tribute gifts were dispatched to the imperial court by the king of the island of Ceylon, and among these presents pieces of white felt figured conspicuously. In this connection it is worthy of mention also that according to an old Chinese account of Java two kinds of felt were obtainable on the island—one dyed a color like granite and another dyed a deep crimson.

John Fryer, who traveled in India and Persia from 1672 to 1681, writes that at Surat the horses were covered warmly with a kind of felt or flockwork, two or three double. Both woven and felted blankets (*kambala*) were made in northern India.

In India felt is at present manufactured in Ladak, Jeypore, Rajputana, Hyderabad and other places, felts being used for blankets, carpets, cushions, bedding, cloaks, and leggings. Colored wool is often used with great effect in producing patterns on the surface of the material. The best sort of felt consists entirely of sheep's wool, or is a mixture of wool with goat's and camel's hair picked and cleaned.

Felt Among Iranians and Turks

The Chinese Buddhist pilgrim Fa Hien started in A.D. 399 on his memorable long journey to India overland from China by way of Central Asia, of which he has left a fascinating account. Passing through the kingdom of Shen-shen south of and not far from Lake Lob (Lob-nor), he made this entry in his diary:

> The clothes of the common people are coarse, and like those worn in our land of Han (China), some wearing felt and others coarse serge or cloth of hair; this was the only difference seen among them.

This is the earliest account of the use of felt in a region of what is now Chinese Turkestan. Turkestan means "land of the Turks." At the time of Fa Hien's visit, however, Turkestan was not yet conquered by Turks, who were then confined to southern Mongolia, but was densely populated by Iranian tribes, members of the Indo-European family, who had a highly flourishing civilization. The Iranian stock at that time covered an immense territory, stretching from the confines of China on the west through the plains of Chinese and Russian Turkestan far into the steppes of southern Russia; for the Scythians so called by the Greek historians are members of the same group, and all of them are close relatives of the Persians. All the tribes belonging to this great Iranian family were active and energetic producers of felt, and it may even very well be the case that they were the initiators of the technique. Certain it is that woven rugs and carpets were first produced in their midst, and as in my estimation carpet-weaving sprang up after and as a consequence of felted rugs, it stands to reason that it was Iranians who invented the manufacture of felt.

Herodotus (IV, 46) describes the Scythians as living on carts which were the only houses they possessed. Rawlinson comments justly that their wagons carried a tent consisting of a light framework of wood covered with felt or matting, which could be readily transferred from the wheels to the ground. Hesiod, the Greek poet, says that Phineus was carried by the Harpies "to the land of the milk-fed nations whose houses are wagons." Aeschylus (Fettered Prometheus 709) sings of the "wandering Scyths who dwell in

latticed huts high-poised on easy wheels." The Scythians also were in the constant habit of wearing felt caps or hats.

The fact of an Iranian felt industry is signally confirmed by the combined testimony of Chinese and Greek observers. Fa Hien has just been called to the witness-stand. According to the Chinese Annals of the T'ang Dynasty, the king of Sogdiana, who resided at Samarkand, was in the habit of wearing a felt hat adorned with gold and precious stones.

The Persian Magi, the priests of Zoroaster, wore high turbans of felt, reaching down on each side so as to cover the lips and sides of the cheeks (Strabo XV. 3, 15). The Lycians who accompanied Xerxes, king of Persia, on his expedition to Greece, were clothed with felt caps surrounded by plumes (Herodotus VII, 92). The Persian soldiers in Xerxes' army wore light and flexible caps of felt which were called tiaras. The Medes and Bactrians were equipped with the same kind of headgear as the Persians. The Armenians were also styled "wearers of felt." Strabo characterizes the Persian cap as "a felt in the shape of a tower," adding that these caps were necessary in Media on account of the cold climate. The king of Persia was distinguished by a stiff felt hat which stood erect, whereas his subjects wore their tiaras folded and bent forward (Xenophon, Anabasis II. 5, 23). Hence in *The Birds* of Aristophanes, the father of comedy, the cock is ludicrously compared to the Great King, his erect comb being called his "Persian cap" (*kyrbasia*). The Athenians no doubt considered this form of the tiara as an expression of pride and arrogance. Xenophon alludes to felted quilts manufactured in Media and spread out as couches or rugs on the ground to sit upon. The Medes also availed themselves of bags and sacks made of felt, and the Persians used felt for the trappings of their horses.

In Anglo-Indian a rug felt is styled *numda* or *numna*. This word is derived from Hindustani *namda* and Persian *namad*. These felt rugs to this day form a special product of the home industry of Khotan whence large consignments are annually exported to Ladak and Kashmir. Sir Aurel Stein (*Sand-buried Ruins of Khotan*, p. 402) has discovered the earliest mention of these felt rugs under the name *namadis* in a Kharoshthi document found in the ruins of Khotan and dated in the ninth year of King Jitroghavarshman, which relates a transaction by a certain Buddhagosha concerning some household goods pawned perhaps or taken over on mortgage. The articles are enumerated in detail, and their value is indicated. Besides sheep, vessels, wool-weaving appliances, and some other implements, this list contains also the felt rugs *namadis*.

Still more fortunate, Sir Aurel succeeded in wresting from ancient refuse heaps and buried temple-ruins of Chinese Turkestan numerous remains of

old felts, which are described in his monumental work *Serindia*. These, in all probability, are the earliest felt remains now in existence that have survived the ravages of time; they are preserved in the British Museum. They should be carefully examined and analyzed some day by a felt expert. Such a study may throw an unexpected light on the early technique of felt making and its historical associations.

Of felt pieces and fragments discovered by Sir Aurel Stein in Chinese Turkestan may particularly be mentioned a felt pad of kidney shape covered with buff silk, a conical headgear in carefully gored yellow felt shaped like a Phrygian cap, shoe-soles, a fragment with a wave-scroll pattern in thin crimson felt sewed on; fragments of felt dyed yellow, red, and scarlet; small pieces of yellow felt painted on a tempera surface with floral and geometrical designs in a variety of colors, and many others. With reference to his discovery of crimson felt it may not be amiss to call to mind the purple or scarlet felt used for draping the funeral pile of Hephaestion when this friend of Alexander the Great died at Ecbatana in 324 B.C. and was interred at Babylon with splendid obsequies by order of his master.

In his work *Ruins of Desert Cathay* Sir Aurel writes,

> Kök-yar is famous throughout Turkestan for its excellent felts, and a good deal of the manifest ease prevailing in these homesteads was no doubt derived from the profits of this flourishing industry.

In the ruined fort of Miran he found a well-preserved felt pouch which might have formed part of a soldier's equipment (plate 138, fig. 27). Kök-yar is also renowned for its felt socks called *paipak*, and Karghalik is the great market for them. In another passage he says,

> Clean mud walls and gaily-colored Khotan felts (*kirgiz*) make even a bare little room look cheerful and homely on a winter evening.

Another archaeological discovery of importance was made two generations ago by W. Radloff in graves of southern Siberia which belong to the Iron age. From these he brought to light a felt boot or sock, the sole of which was wrought from a very fine kind of felt. This was the product of some ancient Turkish tribe. Pointed caps appear frequently on stone monuments or on bronze plaques of southern Siberia, and these were doubtless made of felt.

Reference was made above to the ancient Hiung-nu or Huns as having dwelt under felt tents, and this type of habitation has been characteristic of most Turkish tribes in Asia through all ages. In the sixth century of our era a new Turkish nation inhabiting what is at present southern Mongolia came to the attention of the Chinese, and was called by them Tu-küe

which transcribes the very word "Turk" and which represents the first appearance of this name in history. These Tu-küe, in the same manner as their predecessors, clothed themselves in hide and wool and lived in felt tents. The Kozlov expedition in northern Mongolia, the results of which were published in 1925, found a felt carpet bordered with embroidered silk beneath the coffin in the main tomb excavated. This splendid specimen may be attributed to Hiung-nu workmanship, and is believed to date from the first century before our era. Thick felt soles embroidered with silk or thin thread were also brought to light from the same group of graves. For illustrations see *Burlington Magazine*, April, 1926.

The Kirgiz, another ancient Turkish tribe, according to the Chinese Annals, wore white felt caps, with the exception of their chief, who in the winter wore a sable hat and in the summer a pointed metal helmet with a turned-up tip. They joined pieces of felt together to make tents; the chiefs lived in small tents.

The Shi-wei, an ancient tribe of Manchuria (now extinct), although they lived in huts covered with coarse mats, had felt tents in the Turkish manner placed on carts; these were obviously used for traveling. In lieu of felt, the Chinese Annals say, they placed a package of grass under the saddles of their horses.

In electing their chieftains the Turkish tribes were accustomed to lift them on a white felt rug, not on a carpet. In ceremonial ritual the oldest customs of a tribe are purely preserved and rigidly adhered to, and it is plainly manifested by this practice that the use of felt rugs preceded that of woven rugs among the Turks. It is an interesting fact also that in the Turkish epic poems which clearly mirror a true picture of their ancient primitive life the art of weaving is never mentioned, whereas sewing, embroidering, and felting are referred to as the sole pastime and handicraft of women.

The manufacture of felt covers is the most important home industry of the Kirgiz-Kaizak in Russian Turkestan, and is almost exclusively the business of women. Felts are used by them for covering their tents (yurts), as rugs, door curtains, saddle covers, pouches, bottle cases, mittens, and mattresses. Their sale forms a significant source of income for them; for the Russians also, especially the Cossacks, and the sedentary town-population of Turkestan like the Sarts, make ample use of felt material, e. g. for window shutters, mattresses, and particularly for packing merchandise to be transported by caravan. Owing to the preponderance of felt used in a variety of ways in their equipment, the Cossacks have received from the regular troops the nickname "felt troops." The inhabitants of the towns of

Russian Turkestan also produce felt, but this article is less durable and inferior in quality to the Kirgiz felt. The town products are cheaper and even finer, softer, and smoother than the unpretentious Kirgiz felt, but the latter is ten times as strong as that of the Sarts. This point is of great interest, for it confirms my opinion that felt was originally an invention of pastoral, not sedentary peoples. The latter have merely imitated the former, and while their product is more elegant and refined in appearance, it does not rival the original in solidity and durability. The Kirgiz make white and black felt; the former is regarded as the better one. Besides felt covers the women also make felt hats from white wool for the men. The Turkmens produce from felt slings for the use of boys in killing birds.

For the making of felt the summer wool of sheep is preferred, especially the first wool of the lambs born in the spring. Oil-cake serves as size, and is mixed with the water which is sprinkled over the wool spread over a reed mat. It is first beaten with rods until the mass reaches the same level. The wool is usually arranged in two layers, a lower one of brown cheaper wool and an upper one of white wool. The mat is then rolled up as tightly as possible and tied with cords. This package is rolled to and fro over the ground, pulled along with a rope by some experienced old people, and pushed with the feet by a number of girls following it. The cords are tightened from time to time. Finally the mat is removed, the wool is rolled up again and rolled and rerolled for several hours, while water is continually sprinkled on it. The woolen layers are then spread out, dried at the sun, and the felt is ready, supple and smooth like cloth. Patterns are cut out of colored felt, laid on the felt rug and beaten into it.

Among the Turkish tribes of Central Asia the white wool is first separated from the dark one. The layers are spread out on horse skins and are beaten. They are then sprinkled with water and rolled between two reed mats until the mass is solid. First it is rolled with the hands, then continued with the feet, while six or eight women with arms akimbo shove the roll along in equal pace not unlike the movements of a dance, and songs are chanted at the same time. Patterns, if desired, are laid out in dyed wool.

Franz von Schwarz, formerly astronomer of the Tashkent Observatory, in his book *Turkestan* (1900), makes the following interesting observation:

> Among the natives of Russian Turkestan the belief prevails that scorpions, phalanges, tarantulas, karakurts and snakes cannot move on felt mattresses and that consequently one is safe from their attacks by sleeping on felt covers. In how far this opinion is founded on fact I cannot say with certainty; but this much I know that I myself during my travels when as a rule I used felt covers as a padding for my

camp-bed, was never attacked by scorpions, etc., even in places which teemed with this vermin.

Felt among the Mongols

Marco Polo (book I, ch. 52), the Venetian traveler of the thirteenth century, writes that

> the houses of the Mongols are circular and are made of wands covered with felts. These are carried along with them whithersoever they go; for the wands are so strongly bound together, and likewise so well combined, that the frame can be made very light. They also have wagons covered with black felt so efficaciously that no rain can get in. These are drawn by oxen and camels, and the women and children travel in them.

In the same manner Plano Carpini, in 1246, describes the Mongol houses as

> round and artificially made like tents, of rods and twigs interwoven, having a round hole in the middle of the roof for the admission of light and the passage of smoke, the whole being covered with felt, of which likewise the doors are made.

Ibn Batuta, the eminent Arabic traveler of the fourteenth century, when he betook himself to Sarai, was conveyed in a four-wheeled wagon on which he says was placed a sort of pavilion of wands laced together with narrow thongs; it was very light, covered with felt or cloth, and equipped with latticed windows, so that the traveler inside could look out without being seen; he could change his position at pleasure, sleeping or eating, reading or writing during the journey.

Some of the tents were collapsible, others were massive and stationary. On this point we are informed by Carpini as follows:

> Some of the huts are speedily taken to pieces and put up again; such are packed on the beasts. Others cannot be taken to pieces, but are carried bodily on the wagons. To carry the smaller tents on a wagon a single ox may serve; for the larger ones three oxen or four, or even more, according to size.

The carts that were used to transport the valuables of the Mongols were covered with felt soaked in tallow or ewe's milk, to make them waterproof. The stilts of these carts were rectangular, in the form of a large trunk.

White felt played a significant role among the Mongols during the coronation ceremony. The king was placed on a mat of white felt which was spread on the ground. In A.D. 1206 Temuchin was crowned emperor at an assembly of the princes of Mongolia when he assumed the title Chingiz Khan. On this occasion he was seated upon a rug of white felt and was reminded of the importance of the duties to which he was called. An orator who spoke in the name of the nation addressed the new lord thus:

Direct thy eyes on the felt on which thou sitteth. If thou wilt well govern thy kingdom, thou wilt rule gloriously, and the whole world will submit to thy sway; but if thou wilt do the reverse, thou wilt be unhappy and be outcast and become so indigent that thou wilt not even have a piece of felt on which to sit.

This was not merely intended as a moral exhortation, but the ceremony was imbued with a deeper significance. Among the Mongols, even of the present time, white felt is a material endowed with a sacred character. Placing a person on a white felt rug means expressing to him good wishes for his welfare. For this reason a bride is seated on a white felt during the marriage ceremony, or people at the point of starting on a long journey receive this honor. An animal selected for a sacrifice to the gods is slaughtered on a white felt. The women therefore, in speaking of felt, carefully avoid the common word for it (*ishighei*), which is a term of respect, but substitute for it the words *dzulakhai* or *tolok*. It is on record also that the felt rug which served for the inauguration of Chingiz, dignified by the fortune of the world conqueror, was long preserved by his successors as a palladium and sacred relic.

Timur or Tamerlan (1336-1405), the formidable conqueror, is credited with the invention of a kind of felt hat for the use of his troops when he invaded Persia. These headgears guarded his soldiers more efficiently from the sun and rain than turbans, and distinguished them from their enemies.

Of all facts connected with the history of felt the most singular is that the images of their gods were fashioned by the Mongols from this material. Plano Carpini, who in the year 1246 went as ambassador to the Great Khan of the Mongols, informs us:

They have certain idols made of felt in the image of a man, and these they place on either side of the door of their dwelling; and above these they place things made of felt in the shape of teats, and these they believe to be the guardians of their flocks, and that they insure them increase of milk and colts. Whenever they begin to eat or drink, they first offer these idols a portion of their food or drink.

Friar Rubruk, who also made the wearisome journey to Mongolia, has this story to tell:

And over the head of the master is always an image of felt, like a doll or statuette, which they call the brother of the master; another similar one is above the head of the mistress, which they call the brother of the mistress, and they are attached to the wall; and higher up between the two of them is a little lank one, who is, as it were, the guardian of the whole dwelling.

Marco Polo, with reference to the god of the "Tartars," says,

They have a certain god of theirs called Natigay, and they say he is the god of the

earth, who watches over their children, cattle, and crops. They show him great worship and honor, and every man has a figure of him in his house, made of felt and cloth; and they also make in the same manner images of his wife and children. The wife they put on the left hand and the children in front. And when they eat, they take the fat of the meat and grease the god's mouth withal, as well as the mouths of his wife and children.

Friar Odoric of Pordenone, who visited northern China between 1322 and 1328, speaks of the Minor Friars as exorcising devils among the Mongols and throwing into the fire their idols which are made of felt, while all the people of the country round assemble to see their neighbors' gods burnt.

Felt gods formerly existed among the Turks also. Captain John Smith, the same who wrote *The General History of Virginia, New England and the Summer Isles*, has given a vivid description of the life of the Tartars of southern Russia in his *True Travels, Adventures, and Observations in Europe, Asia, Africa, and America, from 1593 to 1629* (London, 1630). He describes the houses of the princes as

> very artificially wrought, both the foundation, sides, and roof of wickers, ascending round to the top like a dove-coat; this they cover with white felt or white earth tempered with the powder of bones, that it may shine the whiter, sometimes with black felt, curiously painted with vines, trees, birds, and beasts.

His most interesting contribution is the description of the felt gods as follows:

> Having taken their houses from the carts, they place the master alwayes towards the north; over whose head is alwayes an image like a puppet, made of felt, which they call his brother; the women on his left hand, and over the chiefe mistris her head, such another brother; and betweene them a little one, which is the keeper of the house; at the good wives beds-feet is a kids skinne, stuffed with wooll, and neere it a puppet looking towards the maids; next the doore another, with a dried cowes udder, for the women that milke the kine, because only the men milke mares; every morning, those images in their orders they besprinkle with that they drinke, bee it cossmos [kumis] or whatsoever, but all the white mares milke is reserved for the prince. Then without the doore, thrice to the south, every one bowing his knee in honour of the fire; then the like to the east, in honour of the aire; then to the west, in honour of the water; and lastly to the north, in behalfe of the dead.

The Mongols, in making felt, wet and beat sheep's wool with sticks, then press it, and tie the rough strips of wool to grazing horses who drag them across the smooth grass surface of the plain and thus complete them.

Felt among Greeks and Romans

The earliest Greek allusion to felt (Greek *pilos*) occurs in Homer's Iliad (X, 265), where it is said that Odysseus wore a hide helmet lined with felt.

Felt was used by the Greeks for cuirasses and garments, especially rain cloaks; chiefly, however, for tight-fitting caps of a conical shape to be pulled over one's ears to ward off cold or rain (Greek *pilídion*, Latin *pilleolum*). Such a cap was generally worn by artisans and sailors, and appears in artistic representations as their characteristic outfit. Hephaestus and Daedalus wear it as craftsmen; Charon and Odysseus, as seafarers. Brimmed hats also were made of felt. It is a curious coincidence that the Greek fishermen were equipped with a felt cap as their fellow-workers in China still are. In the description of a fisherman's apparatus Philippus mentions "the felt cap encompassing his head and protecting it from wet."

Boots and socks were likewise made of felt, and there is an instance on record that it was used in lieu of armor by Caesar's soldiers when they were much annoyed by Pompey's archers and in need of arrow-proof jerkins (*Bellum civile* III, 44). Thucydides refers to a similar expedient to protect the body from arrows. Even in besieging and defending cities felt was used, together with hides and sackcloth, to cover the wooden towers and military engines.

The ancients used chiefly sheep wool for making felt, more rarely the hair of goat, camel, hare, and beaver. It seems that felt was sometimes used to cover the bodies of animals. According to Aristotle, the Greeks clothed their sheep with soft wool either with skins or with pieces of felt, and the wool turned gray in consequence.

The Romans received the use of felt together with its name from the Greeks (Latin *pileus*, *pilleus*, *pileum* or *pilleum*); this word, in particular, denotes the tight-fitting felt cap worn by the Romans at meals, theatrical performances, and festivals. It is a curious fact that the felt cap was among the Romans a symbol of liberty; when a slave obtained his freedom, he had his head shaved and wore the skull-cap of undyed felt. On the other hand, slaves when they were sold by their master, wore this cap as a sign that the seller would not offer any guaranty for them. The phrase *ad pileum vocare* ("to call to the felt cap") had the meaning "to call the slaves to freedom, to provoke them to rebellion through promises of freedom." At the death of Nero in A.D. 68 the common people roamed about in the streets of Rome as an expression of their joy. Suetonius, in his Life of Nero, speaks on this occasion of the "felted mob" (*plebs pileata*). In allusion to this custom the figure of Liberty on the coins of Antoninus Pius (A.D. 138-161) holds the cap in her right hand.

Pliny (VIII, 73) writes that

> wool is compressed also for making felt, which when soaked in vinegar is capable of even resisting iron; and what is still more, after having gone through the last process, wool will even resist fire.

Papadopoulo-Vretos, in 1845, made this communication to the Academy of Inscriptions and Letters of Paris:

I have macerated unbleached flax in vinegar saturated with salt, and after compression have obtained a felt, with a power of resistance quite comparable with that of the famous armor of Conrad of Montferrat; seeing that neither the point of a sword, nor even balls discharged from fire-arms, were able to penetrate it.

The felting process was denoted by the verb *cogere* ("to bring together, to pile up"). A felter was called a *coactor*, *coactiliarius*, or *coactor lanarius* ("wool felter"); his art was designated *ars coactiliaria;* felt products were styled *coacta*. In an edict of the Emperor Diocletianus (A.D. 285-305) is mentioned a horse-cover of felt under the term *centunclum equestre coactile*.

The question may be raised whether the Romans transmitted the knowledge of felt to the Celtic and Germanic peoples, or in other words whether the use of felt in mediaeval and modern Europe is a heritage of classical civilization. The Germanic languages have a word for felt in common: German *filz*, Dutch *vild*, Danish-Swedish *filt*, Anglo-Saxon *felt*. This word is connected by linguists with Old Slavic *plusti*. It is noteworthy that the word for felt in the Romanic languages is not based, as might be expected, on Latin *pileus*, but on the Germanic word: Italian and Portuguese *feltro*, Spanish *fieltro*, French *feutre* (Italian *feltrare*, French *feutrer*, "to felt"), hence mediaeval Latin *filtrum*. It is therefore probable that the Romanic nations received the knowledge of felt not from the ancient Romans, but from Germanic tribes early in the middle ages. The latter may have acquired the art from their eastern neighbors, the Slavs; and the Slavs derived their knowledge from Scytho-Siberian-Turkish peoples. The Russian word for felt, *woilok*, is a loan-word based on Turkish *oilik* ("that which serves as a cover"); the same word appears in Polish as *wojlok*.

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EARLY CULTURES OF ATLANTIC EUROPE

By C. DARYLL FORDE

THE study of European prehistory began with a linear historical classification of major periods— of chipped stone, polished stone and bronze. It was soon recognized that more subtle distinctions and subdivisions were necessary in the presentation of the early advances of human culture, but attempts to give breadth to this one-dimensional scheme were long delayed, and the efforts of Breuil, Obermaier and others to map out the distributions and regional variations of paleolithic cultures are but slowly being reflected in the general body of scientific thought. Stranger still, however, a series of later cultures in which more abundant material affords the opportunity for discrimination based on the variations of elaborate artefacts such as pottery, are viewed by all but a small band of specialists as falling into a broad category known as the neolithic.

Recognition was but slowly accorded to the occurrence of copper implements in certain of these pre-bronze age cultures and even then when the terms "eneolithic" or "chalcolithic" had come into current use, the real significance of the early copper-using cultures as, in many instances, the progenitors of "neolithic" cultures was entirely missed and the development of agriculture, pottery and settled habitation was regarded vaguely as the achievements of new races which moved in undifferentiated groups into lands freed from the grip of ice.

The field aspects of these later cultures differ fundamentally from the paleolithic in two important features which can scarcely be overestimated— the far more infrequent occurrence of stratified sites and the preponderance of material obtained from burial sites over that from habitations. Yet despite the scarcity of invaluable stratigraphic data it is actually possible at the present time to attempt a far more detailed delimitation of culture provinces and lines of movement for the so-called "neolithic" and "chalcolithic" periods than may ever be possible for the paleolithic.

Although the old hiatus once believed to have existed between paleolithic and "neolithic" times has now been bridged by the discovery of the post-Magdalenian cultures referred to collectively as mesolithic or epipaleolithic,[1] it yet remains true that the establishment of the so-called

[1] The term epipaleolithic, although clumsy, is the more suitable since these cultures are not functionally intermediate, and do indeed represent the final efforts of paleolithic groups.

"neolithic" cultures in Europe represented a real break in historical continuity. There is very definite evidence for almost every region that the appearance of agriculture, pottery, and polished stone tools, was not due to the slow experimenting of epipaleolithic groups, but to the arrival of new peoples of distinct cultural tradition who had practised these crafts before their penetration of western Europe in the ameliorated climatic conditions of the sub-Boreal phase.

The routes and periods by which these elements of the new cultures were propagated varied considerably in different areas. Although it is probable that in some areas epipaleolithic groups acquired such arts as pottery-making by slow diffusion, the major process was one of colonization by new peoples. Successions of communities propagated one from another, moving along the riverways, crossing heathland and moor and skirting the dense post-glacial forests, established themselves in new territory that was virtually empty.

Some elements in the later epipaleolithic industries are most satisfactorily accounted for by the arrival of a vanguard of neolithic folks among relatively numerous epipaleolithic survivors. The variations already developed in the "neolithic" provinces of southern and eastern Europe, the distinctiveness of the various cultures surviving from the old stone age and above all the different conditions, geographical and cultural, under which the new contacts were effected, resulted in blends of distinct character which were themselves extended over considerable areas.

Pottery first appears sporadically in western Europe in later epipaleolithic cultures shortly before the establishment of true "neolithic" settlements. It is difficult to believe that dwindling remnants of food-gatherers would have independently discovered the art of pottery and perhaps the elements of agricultural practice at the very period when peoples among whom these crafts were well established were extending westwards across Europe and already lay at their threshold.

These theoretical considerations are further strengthened by a consideration of the epipaleolithic cultures themselves. Since Piette's identification of a distinct post-Magdalenian, pre-Neolithic layer at the entrance to Mas d'Azil (Ariège, France)[2] the distribution and relationships of the various cultures have been provisionally established.

The Tardenoisean phase is characterised by microlithic flint industries. The microlith or pigmy flint was especially developed in consequence of the adoption of a composite tool in which small flint blades were set in wood or bone. This development is variously claimed to have taken place

[2] Assoc. française pour l'avancement des sciences, Pau, 1892.

in the western Mediterranean or in northern Africa. While the Solutreans and Magdalenians successively occupied western and central Europe, the Aurignacian culture continued relatively undisturbed further to the south. Burkitt[3] lays great stress on the development shown in the stratification in the Grotte des Enfants, Mentone, since Tardenoisean types may here be seen slowly emerging from older Aurignacian forms. Early microlithic industries have been discovered elsewhere in this immediate area especially in southern Italy (Romanelli, Otranto) and Sicily (Termine Imerese).

Obermaier[4] and Bosch Gimpera,[5] however, insist on a North African origin for these industries, and believe them to have been originally introduced into Europe by extensive and prolonged migrations of Capsians from northwest Africa into the Iberian peninsula.

Contemporaneous and in some areas blending with the Tardenoisean was the culture represented at Mas d'Azil. Childe[6] rightly insists on the distinctness of the Azilian culture as a degeneration from the Magdalenian. The purest Azilian stations are characterised not by microliths but by numerous rough bone harpoons made, like the Cantabrian harpoons of Magdalenian date, of deer horn and perforated for hafting, and Azilian flint types can be similarly related to the Spanish Magdalenian.[7] The relations between the Azilian and Tardenoisean cultures are difficult to define since the latter has rarely been found in a well defined stratigraphical sequence. Both were, however, directly continuous from preceding, if distinct, paleolithic cultures.

Composite tools with their associated microlithic industry were propagated northwards in the wake of the retreating reindeer in the warming climate of post-Magdelenian times. They were introduced over the greater part of Europe, continued in use throughout the kitchen-midden period, and survived in many of the later, neolithic, settlements. (Figs. 1 and 2.)

In the Baltic area, which had been closed to man throughout the glacial period, the microlithic technique appears in the Maglemosean culture[8] of the first occupants. On account of the highly individualized forms in

[3] Burkitt, M. C., Prehistory, 1921 p. 145, Idem, Our Early Ancestors, 1926, p. 19.

[4] Obermaier, H. Fossil Man in Spain.

[5] Bosch Gimpera, Ensayo de una reconstruccion de la etnologia prehistorica de la peninsola Iberica, 1923.

[6] Childe, V. G., Dawn of European Civilization, 1925, p. 6.

[7] Obermaier, H. Das Palaeolithikum und Epipalaeolithikum Spaniens, Anthropos, 14–15, 1919–20, p. 165.

[8] Johansen, K. F. Une station du plus ancien age de la pierre. *Mem. Soc. Roy. Antiquaires du Nord* (*subsequently cited as MSAN.*) 1918–19.

bone work, including narrow harpoons barbed on one side, pierced antler tools and hafts, the Maglemosean is sometimes claimed to have originated

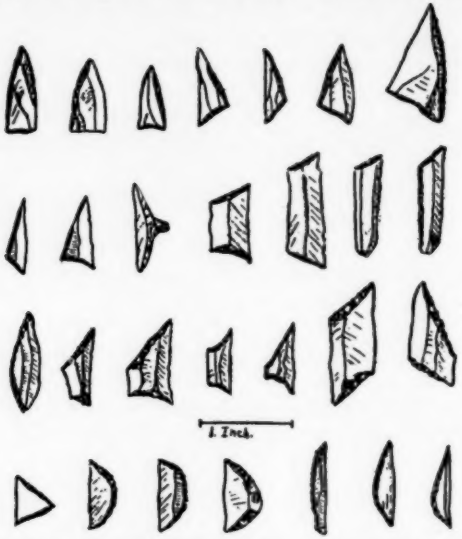

FIG. 1. Tardenoisean microliths from Western Europe. (after Burkitt)

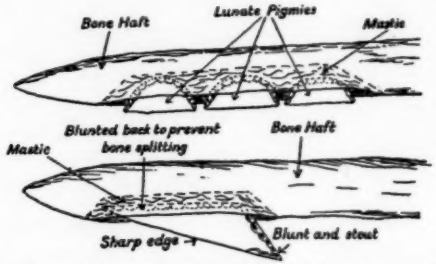

FIG. 2. Theoretical reconstruction of method of setting microliths in composite tools. (after Burkitt)

independently of earlier or contemporaneous cultures elsewhere in Europe. But the bone harpoons and chisels clearly derive from Magdalenian types and the engravings on bone frequently recall paleolithic forms. Bosch-

Gimpera suggests "Capsian" intermixture to account for the microlithic industry. Burkitt while admitting the close parallels between Maglemosean and Tardenoisean in the use of flint, yet claims that

> like the Tardenoisean [the Maglemosean] was aware of the advantages of a composite tool, but there is no reason for interrelating the two cultures.[9]

But it is, on the contrary, highly improbable that two adjacent cultural provinces should at the same period independently conceive and develop an instrument so specialized as the composite flint and wood or bone tool. Burkitt has himself adduced evidence for the slow development of microlithic technique in the Mediterranean area and since the Maglemoseans cannot have penetrated northward into the Baltic region before the retreat of the Yoldia Sea and the beginning of Ancylus times, there can be little doubt that their ancestors previously lived within the sphere of Azilio-Tardenoisean culture; for we have definite evidence that the Tardenoisean culture, as such, penetrated effectively into Poland and south Russia in the east and as far north as the British Isles. Furthermore Kosłowski[10] has shown that some of the characteristic traits of Maglemose also occur in epipaleolithic cultures of northeastern Europe. This suggests that the Maglemoseans reached Scandinavia from the southeast and that some elements of their culture are to be traced back to the upper palaeolithic of Moravia. It is, in any case, clear that the Maglemosean culture represents a further extension of the southern epipaleolithic, with which were amalgamated other elements, such as the superior technique in bonework, which may have been contributed by upper paleolithic groups in north central Europe.

At a later stage there followed a remarkable adaptation to the abundant shell life in the warming waters of the Atlantic shores. A series of coastal settlements, which have left evidence of their occupation in large kitchen-middens of shell debris, extended from Portugal to the Baltic. The abundance of pigmy flintwork in the lower levels of the shell mounds indicates that everywhere they were established by Azilio-Tardenoisean folk. At Mughem (Cabezo d'Aruda etc.) in Portugal a late Tardenoisean date is indicated by the presence of the trapeze from the lowest levels. Chisel-bladed ("transverse") arrowheads are also claimed for the Portugese shell mounds.[11] This type of arrowhead does not appear further north in Europe until Ertebolle and Campigynan times. The Mughem type is

[9] Burkitt, Our Early Ancestors, p. 39.

[10] Kosłowski, L., L'Epoque mesolithique en Pologne, L'Anthropologie, 36, 1926.

[11] Childe, Dawn, p. 4 and fig. 2.

distinct from these late forms and may be merely a Capsian trapeze, but the appearance of such arrowheads in the early Portuguese shell mounds would present no difficulty since the chisel-edged arrowhead was in use in Upper Egypt from early predynastic times and early diffused westwards in North Africa.[12]

The coastal settlements of the Landes and the shores of Bas Medoc (France) may be earlier still since triangles and micro-burins (pigmy gravers) abound, but the trapeze is not well developed.[13] Similar industries extend further north along the French coast around the estuary of the Loire (Buttes de Rocher, Guérande) and in southern Finistère (La Torche, Ile de Sein, etc.).[14]

In the Baltic area the shell mounds (Ertebolle) succeed the Maglemosean culture and proceed directly from it. The continuity is so close that it is difficult to consider the Danish kitchen-middens as directly related to the shell mounds of the Atlantic coast. It is not impossible, however, that shell mound folk from the Atlantic, penetrating the Baltic area, produced the Danish kitchen-midden culture by taking over the characteristic Maglemosean stone and bone tools. Since, however, apart from microlithic flintwork, which was common to the greater part of Europe at this time, there are no direct links between the ill-defined cultures of the earlier Atlantic shell mounds and the Danish kitchen-middens, such a suggestion rests only on similarity of habitat and approximate contemporaneity.

But the Danish midden culture also affords evidence of close connection with other early settlements. In the more interior districts of western Europe a further specialization appeared in the Campignyan culture, of which numerous habitations have been found in northeastern France and Belgium.[15] This culture which has frequently been misrepresented as

[12] Cf. Childe, The Most Ancient East, 1928, p. 69.

[13] Cf. Burkitt, M. C., Prehistory, p. 150.

[14] Du Chatellier, P., Les Epoques Préhistorques et Gauloises dans le Finistère, p. 9 ff; idem, Le Kjoekenmoedding de la Torche, Mem. Soc. d'Em. Côtes du Nord, 1881.

[15] Confusion as to the position of the Campignyan culture has been occasioned largely by the frequent survival of Campignyan tools in neolithic settlements. Furthermore, the excavations of the original site near Bouillancourt-en-Sèry, Seine Inférieure, were not well controlled and the conditions there are uncertain. Neolithic elements including polished stone celts and sherds were among the material recovered, but it is uncertain whether the station itself was late and mixed or whether stray, surface neolithic material was confused with material from the hut foundations proper. But the existence of a well defined inland culture parallel with the shellmounds can be hardly doubted for the characteristic tools have been reported from closed finds over a wide area in north eastern Europe; see Capitan, L., Le Campignien, Rev. Ecole Anthrop. de Paris, 1898.

early, in the sense of incipient, neolithic, is remarkable for the development of simple but effective chipped tools, the Campigny pick and hatchet. The workmanship required was not of high order but the economy of means whereby a sharp and tolerably straight edge was produced in the hatchet indicates decided originality and emancipation from the paleolithic tradition. This form occurs occasionally in Maglemosean stations, but whether such stations are late and the hatchets intrusive cannot yet be determined. It is possible, although unlikely, that the form was first developed in the Baltic area. Roughly shaping a piece of flint or stone to flat triangular form, a large flake was struck off at the broad end, leaving a cutting edge between the new surface and the underside of the flint.

FIG. 3. Campignyan axe-hatchets. (after Déchelette)

(Fig. 3.) The chisel-bladed arrowhead which is also abundant in Campignyan settlements was produced with a similar technique. For the rest, the stone work consists of rough picks, scrapers and awls and occasional small gravers. Well characterized microliths and the composite tool were probably absent.[16]

The Baltic kitchen-middens already referred to were closely related to the Campignyan culture; hatchets, arrow-points, picks and awls of Campigny type are abundant. Although there is little evidence to indicate the relative dates of the cultures, it is generally assumed that the distribution of these forms indicates Campignyan intrusion in the Baltic area as a strong formative influence on the midden culture.

[16] Campignyan forms survived in many backward settlements of neolithic and even later times, and the hatchet is by no means always a certain guide to the date of its context. cf. Childe, V. G., Dawn, p. 18.

In all these industries so far reviewed there is no trace of the true neolithic arts. The only domestic animal is the dog, which had been used since Azilian times. But in the upper levels of several of these epipaleolithic cultures the first signs of the new crafts appear. A little poor pottery occurs in the uppermost layers of the shell mounds at Mughem (Portugal); yet except for a few coarse sherds, pottery is still absent in the later shell mounds of Asturia.[17] De Morgan's[18] claim that the Campignyans throughout possessed domestic animals, tilled the soil and made incised pottery, has never been generally admitted, for these traits are all intrusive in the Campignyan proper as established elsewhere while the site in question was inadequately investigated. But that Campignyan settlements survived after the "neolithic" intrusions and have left on their floors objects borrowed or copied from the new peoples, there can be little doubt.

In the Ertebolle shellmound culture of the Baltic a definite pottery form appears. Coarse conical based pots of poorly baked clay occur occasionally throughout the greater part of this culture. But this ware is no prototype of the later neolithic wares of this region. It is found occasionally in dolmen times, but only in remote corners where shellmound folk survived. Although this Ertebolle pottery undoubtedly precedes true neolithic forms in the area and no prototype has been found in a more advanced culture it is not seriously regarded as an independent development by any but those who would derive all the neolithic arts from the Baltic region.[19] True neolithic celts and pottery of the dolmen type are found only in the uppermost layers of middens such as Langeland, which continued to be occupied in full neolithic times. At Limhamm (South Sweden) the upper levels of a midden yielded the bones of domestic animals and grains of wheat, others have yielded objects of passage-grave date.[20] The evidence is everywhere the same, that neolithic civilization was introduced by new peoples among whom its fundamental crafts were already long established.

Elements of the Megalithic Civilization

In the west these new arts and crafts are primarily associated with the builders of massive stone tombs known as megalithic monuments. The megalithic builders are therefore the first truly civilized people in Atlantic Europe, and we may avoid the ambiguous and frequently in-

[17] Sella, V. dcl.; El Asturiesne, Mem. com. invest. pal. y prch. No. 32, 1923.
[18] De Morgan, J. Prehistoric Man, 1924, p. 7.
[19] e. g. Kossinna, G., Die Deutsche Vorgeschichte, Mannus Bibliotek, No. 9, 1912.
[20] Childe, V. G. Dawn, p. 15.

accurate term "neolithic" by characterizing their variant cultures as part of a Megalithic Civilization in which the massive stone tomb is a stable and distinctive element. During the period of its expansion other civilizing forces were penetrating the area from central Europe, but the megalithic civilization was dominant throughout the region as a whole.

Although their habitations have frequently been lost or obscured by the occupations of subsequent peoples, the rough stone monuments of the megalith builders have, in virtue of their size and solidity, remained as permanent memorials to this early civilization. Pillage and demolition, operating at an ever increasing rate since Roman times, have destroyed much evidence. Many megalithic structures have been entirely obliterated, others ruined and partly destroyed. But the labor involved in their erection has been less readily available in later times for their destruction. Many have in consequence been preserved almost intact.

Destruction has, moreover, been sporadic; tenacious of existence as they are in well tilled plains as well as on barren uplands, there is good reason to believe that their present numbers and distribution represent fairly well, if only in diminished approximation, the areas of settlement and concentration of the early peoples who built them.

The range of the West European megalithic monuments extends from the Iberian peninsula and the islands of the Western Mediterranean through France and the British Isles to the lands flanking the entrance to the Baltic Sea. They are found in the heart of rocky plateaux in central France e.g. the departments of Averyron, Lozère etc., along the low shores of Denmark and in the most inaccessible islands to the far north of Scotland. (Fig. 4.)

It has long been claimed that similarities in the structure of these monuments and parallels to be observed in certain items of their furniture, indicated a community of origin and the spread of an early civilization in Atlantic Europe.[21]

With increasing comparative knowledge both of the megalithic cultures in western Europe and of the early civilizations of the Ancient East and the Aegean, a considerable literature has grown up around the problem of the origins of megalithic architecture and the civilization it connotes. Although an independent origin for megalithic architecture in the separate areas is occasionally claimed, it is generally accepted that there is an ultimate and genetic relationship between the megalithic remains of Western

[21] For early discussions of the subject see Fergusson, Rude Stone Monuments in all countries, and Montelius, Der Orient und Europa, Stockholm, 1899.

Europe. It is established moreover, despite a few dissentient voices,[22] that they indicate the line of an early spread of the fundamental arts and crafts of civilization in a northerly direction from Iberia and the Western Mediterranean. On the foundations of Montelius' *Orient und Europa* a

FIG. 4. The Megalithic culture of Western Europe.

number of writers have elaborated the thesis of an ultimate oriental source for the elements of the megalithic culture, claiming that its westward spread represents a major process in the rise of European civilization com-

[22] E.g. Kossinna, G., *Die deutsche Vorgeschichte*, Mannus Bibliotek, No. 9, 1912, p. 7 ff, who claims a Baltic origin and a southward diffusion. Sophus Müller criticised these views on the basis of the Scandinavian material, in L'Age de Pierre en Slesvig, MSAN, 1914–18, p. 26 ff.

parable to the diffusion along the Danube corridor more recently demonstrated by Childe.[23]

The megalithic peoples frequently erected standing stones (menhirs) either singly or in rows (alignments) and circles (cromlechs), but the central element of the megalithic architecture is the tomb and the vast majority of the monuments are undoubtedly funerary in character. Although variations were developed, essentially similar types of tombs are to be found throughout the entire range. The importance of variations as indications of the sequence of settlement will be discussed later. The furniture of these tombs yields important indications of the activities of the people and, as has already been said, of their external relations. Occasionally where a well preserved settlement is found in conjunction with a megalithic necropolis, as at Los Millares in Almeria,[24] a fairly detailed reconstruction of the whole settlement and life of the community can be made. But more frequently the disturbance of subsequent occupations, the lack of even approximately closed finds, with consequent uncertainty of chronological relationships and, above all, the rarity of systematic exploration, combine to reduce to meagre proportions our knowledge of their habitations and daily life.

The concentration and permanence of their tombs indicate that the megalithic builders were a sedentary people. Although it has been claimed, on negative evidence, that Long Barrow People in Britain were simple pastoralists, there is adequate evidence for the practice of agriculture in the megalithic culture in western Europe as a whole. The sedentary and agricultural characters of the megalithic peoples is abundantly testified in Iberia in the stations of the South. In Denmark, the frequent imprint of grains of barley occurs on the dolmen pottery[25] and in Brittany, as elsewhere, there is indirect evidence of the cultivation not only of food grains, but also of materials for weaving textiles.

The forms and ornament of pottery associated with megalithic tombs are of the greatest value in the establishment of interrelations. Specific forms such as the bell beakers, indicating contact between different areas will be considered later, but the wide distribution of a group of decorative techniques including the Combed Style (*style denté* of Sophus Müller), is of great significance for the area as a whole since their distribution is

[23] Dawn of European Civilisation, 1925; The Danube thoroughfare and the beginnings of Civilisation in Europe, Antiquity, Vol. I, p. 79; and his forthcoming book 'The Danube in Prehistory' (Oxford).

[24] Siret, L. L'Espagne préhistorique. Rev. Questions Scientifiques, 1893, p. 518, fig. 168.

[25] Sophus Müller, p. cit., p. 63.

very wide and coincides to a remarkable degree with that of the megalithic tombs. "Comb" ornament includes designs of zoned bands, triangles, lozenges and zigzags (both direct and reserved) all executed with a comb-like instrument (a comb or toothed wheel of wood or bone) the imprint of which left a line of small sharp incisions. The imprint is usually oblique in relation to the direction of the decorated band or the lines of the vessel. This style is specially well developed in the bell beaker where it is frequently encrusted, but it occurs on other forms and is associated with other decoration on the same pot, including incised and "pecked" ornament effected with pointed tools, cardium shell impressions and, in some areas, imprints of two-stringed cords. Incisions and cord imprints were sometimes filled with a white calcareous paste, emphasizing the design against the dark, frequently burnished background of the ware. The whole group of techniques combined to form the Fine Early Style ("riche style ancienne") as defined by Sophus Müller in the later dolmens and early passage graves of Denmark.[26] The various techniques are common to settlements throughout the Atlantic littoral and western Mediterranean. The resemblances are not merely general, they include specific analogies in technical detail as well as remarkable parallels in complex designs. Comparing specimens from Iberia and Denmark, Sophus Müller[27] claims that:

> with this perfect correspondence between very complex ornamental motifs, one cannot doubt that there is a close relationship between the two examples. But this relation extends to the entire style studied here; the fundamental motives are in great part the same, the designs and their employment equally resemble one another . . . . . There existed a common artistic style which we may provisionally call the Hispano-Danish, and this style appears in Denmark and the south at corresponding points in the cultural evolution.

The pottery of Angelhu Ruju (Sardinia) with zigzag and lozenge decorations, direct and reserved, has precise parallels in Iberia and Brittany as well as in Denmark. In his more elaborate analysis of the early pottery styles of Europe[28] the unity of the Fine Early Style throughout the western Mediterranean and the Atlantic littoral is demonstrated in detail. Figs. 5 and 6.

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[26] MSAN., 1914–19, p. 85 ff.

[27] MSAN., 1914–19, p. 93. cf. figs. 57 and 65; see also Siret L. Questions de Chronologie et d'Ethnographie Iberique, Paris, 1913, pp. 206 ff. p. 214.

[28] Sophus Müller, MSAN., 1920–24, Communautés Stylistiques en Europe dans le recent age de la pierre, pp. 207 ff.

FIG. 5. Sherds of incised ware in the *Fine Early Style*, Denmark. (after Sophus Müller).

FIG. 6. Sherds of bell beaker pottery decorated by *comb* impression, Carmona, Andalucia (after Åberg) (1/2?).

The Culture Sequence in Iberia

The megalithic chambers of Spain and Portugal are generally considered to follow an evolutionary sequence indicating an Iberian origin for the rough stone tomb. A slow development of material culture is said to accompany the elaboration of more massive sepulchres. This sequence adapted first by Cartailhac from Montelius' classification of Scandinavian megaliths has been discussed in a long series of archeological writings.[29] Bosch Gimpera even claims to identify a division into five successive periods (late neolithic, early copper age A and B, full copper age A and B) to be correlated with various alleged stages in the evolution of the megalith grave.[30]

It is sometimes assumed that the megalithic chamber was not originally covered by a mound but originated in North-Western Iberia as a large polygonal boxlike construction of rough stones which imitated a natural cave. Desire to increase the protection of the dead led to the erection of a covering tumulus which, in its turn, since the burial was collective and used for many generations, demanded a gallery allowing access to the chamber.

At a further stage by hypothetical processes variously alleged to have been indigenous (Bosch Gimpera, Leeds etc.) or to have been introduced from the eastern Mediterranean (Wilke, Obermaier, etc.) a domed roof was produced by corbelling the upper courses of a dry-walled chamber. At this same period, the megalith-builders began to excavate into the ground, especially on a hill-slope, thus burying the megalithic tomb, to which access was gained by a descending ramp. To this stage also are ascribed the rockhewn, non-megalithic, passage-tombs, such as Palmella, in south-west Portugal. Meanwhile the megalithic passage-dolmen con-

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[29] See especially—Cartailhac, E. *Les Ages Préhistoriques de l'Espagne et du Portugal*, Paris, 1886: Siret, L., L'Espagne Préhistorique, *Rev. Quest. Scientifiques*, Brussels, 1893, and Questions de Chronologie et d'Ethnographie, Paris, 1913; Dechelette, J. Essai sur la Chronologie Préhistorique de la Peninsule Iberique, *Rev. Arch.*, 12, 1908, pp. 219 ff.; Wilke, G., Südwesteuropäische Megalithkultur . . . . , *Mannus Bibliotek*, 7, 1912; Leeds, E. T., The Dolmens and Megalithic Tombs of Spain and Portugal, *Archaeologia*, 70, 1918–20, pp. 201 ff.; Bosch Gimpera, P., La Arqueologia Preromana Hispanica, in Schulten's *Hispania* (Appendix), Barcelona, 1920; Obermaier, H. El dolmen de Matarrubilla, Sevilla, *Comision de Investigaciones Paleontologicas y Preistoricas*, 1919–21, No. 26; Åberg, N., *La Civilisation Enéolithique dans la Peninsule Iberique*, Leipzig, 1921; Bosch Gimpera and Pericot, L., Les Civilisations de la Peninsule Iberique . . . , *L'Anthropologie*, 35, 1925, pp. 409 ff. Bosch Gimpera, P., Pyrenäenhalbinsel, B. Neolithikum und Kupferzeit, Reallexikon der Vorgeschichte, 1928, 10, p. 348 ff.

[30] L'Anthropologie, 35, 1925, p. 414 ff.

tinued in use and degenerated into the covered gallery in which distinction between funerary chamber and passage was lost and the scale of the monument frequently reduced. The final stage was reached in the closed slab-cist of much smaller dimensions in which only one to two bodies were buried.

Such a typological series has the attractive quality of appearing to explain without remainder the genesis and evolution of the megalithic tomb. So long as attention is restricted to the forms of selected tombs, its very neatness all but compels acceptance. But the analyses of geographic distribution, of tomb furniture, and of relationships with the megalithic culture in Western Europe as a whole, bring out the grave difficulties involved in the application of this typology. Tombs closely resembling these alleged stages are to be found in widely separated areas, e.g., S. France, Brittany, N.E. France, the British Isles, and the Western Baltic region. In the last area a definite chronological sequence of the same kind has been claimed and widely accepted. If the evolution of a series of successive types in Iberia be valid, then, since the various types are represented so widely elsewhere, it might be expected that the successive stages of megalithic architecture were propagated as developed throughout Western Europe; that the simple closed dolmen, for example, was carried along the Atlantic margin at a time previous to the elaboration of the passage dolmen and the cupola tomb in Iberia. If this were so, the grave goods of the tombs would be expected to show great homogeneity throughout the megalithic areas and in each region they should vary more or less definitely according to the type of tomb, i.e., the furniture parallels should tend to be with the tombs of the same type in different areas rather than with tombs of different types in any one area. This, however, is not so. Apart from the tombs themselves, it has required long discussion and marshalling of evidence to establish true cultural unity between the different "megalithic" areas.[21] In France as a whole and more especially in the Breton peninsula, it is very difficult to impose a chronological sequence of this type, and tombs of very different form, from square-chambered passage dolmens to slab-cists, are found from their grave goods to belong to the same period.[22] In Iberia elaborate incised and "combed" ornament is almost entirely absent in the small dolmens of N. Portugal and Galicia and very rare in the smaller

[21] The significance of the megalithic culture was long obscured by these distinctions, as summarized in the terms "neolithic" "chalcolithic," "bronze age," etc. with their chronological implications.

[22] Le Rouzic, Z., Carnac, Fouilles faites dans la region. Campagne de 1921. Nancy, 1922, p. 118, and Forde, C. D., The megalithic monuments of Southern Finistère, Ant. Journ. 7, 1927, pp. 13, 21.

passage dolmens further south in Central Portugal. On the "evolutionary" theory the megalith builders had at this stage little knowledge of these decorative techniques which are abundant in the larger megalithic tombs of the south. Yet in Denmark these styles occur with their undoubted southern affinities in some of the small dolmens as well as in the *chambres des géants* (passage dolmens).

Since the theory of a slow evolution of megalithic architecture in western Iberia receives little corroboration from the comparative study with other megalithic areas in western Europe, it becomes very necessary to examine its foundation and to inquire whether there may not be other explanations of the variety of megalithic forms in Spain and Portugal and of the parallels between the Iberian forms and those of other areas.

The arrangement of any typological sequence, however neat the dovetailing of objects and however probable the a priori grounds adduced, must always depend for its final validity on a demonstration of the agreement of the proposed sequence with the known or probable history of other objects found associated with the several elements. The "primitive" tombs should yield prototypes of the grave goods found in the "later" and more magnificent passage-dolmens, rock-cut tombs and corbelled vaults. In brief, the typological sequences of the objects found in the megalithic monuments should certainly run parallel with the evolution of the tombs themselves. Bosch Gimpera claims that this is so; he contents himself, however, with somewhat isolated descriptions of tombs and of objects which he would assign to the various stages. Without complete analysis of the material, these elaborate subdivisions cannot be regarded as proven.

Åberg's survey, based primarily on the Iberian museum collections, is far more comprehensive and impartial. It reveals the difficulties of integrating the theory of megalithic "evolution" with the evidence of the grave furniture. He adheres to the orthodox theory of the development of megalithic architecture, but in his summaries of the tomb material and in the inventories of a large number of monuments of different types, no evidence is adduced to confirm us in the belief that there occurred in northwestern Portugal the invention of the simple dolmen which was in the course of time elaborated into the great megalithic tombs and cupolas of Alcalá, Nora and Antequera or the rock-cut chambers of Palmella. Åberg admits the lack of evidence; he shows, for example, that one element or another of the fully developed Palmella furniture occurs frequently in small passage dolmens. He accounts for the sporadic distribution of the Palmella-Ciempozuelos incrusted ware by saying that

the pottery of Palmella was not the only one in use at that period.

It is shown that other incised and unornamented wares described as typical of the passage dolmens coexist with Palmella forms in the same tombs.[33] Indeed the unornamented pottery which is generally claimed to be special to the megaliths of central Portugal and more "primitive" than the Palmella ware is shown to be frequently associated with 'Palmella' and incised wares in a single tomb, and is, moreover, closely similar to that characteristic of the slab cists.[34]

This is an alarming result for it approximates pottery yielded by monuments near either end of the postulated megalithic evolution. Åberg realizes that

> the funerary furniture should follow the evolution of the types of tomb

but admits that

> in the material at our disposal it is impossible to demonstrate this evolution outside that which concerns small details such as the schist and marble idols and the tanged arrowheads. We are not, then, up to the present, able to establish a division in periods.

Despite the admirable commonsense of this analysis, he attempts to mitigate its destructiveness to the theory of a long megalithic evolution by appealing, in the absence of corroborative evidence, to the theory that since the megalithic monuments were collective tombs used for a long period

> the most ancient furniture might then have been removed, destroyed, or mixed with more recent objects and one could scarcely distinguish the first from the second.

This, however, is no avenue for retreat. The slab-cists are not collective monuments and it has already been claimed that their pottery has "primitive" features and resembles that of the "earlier" of the Portuguese megaliths. Can we, in any case, assume the existence of a hypothetical primitive furniture in the smaller passage dolmens which was systematically removed by a later people to the confusion of archaeologists? The furniture of the slab-cists, moreover, varies considerably from region to region and approximates that of the larger tombs of their vicinity. In central Portugal metal is absent from the cists and their furniture corresponds so completely with that of the abundant passage dolmens of the area that Correia justly insists that they cannot be regarded as intermediate forms in an evolution

[33] Åberg, op. cit., pp. 113–114.
[34] Åberg., op. cit., pp. 113–114.

since they are individual graves and contemporaneous with the "dolmens."[35] In Algarve to the south, on the other hand, where ribbed copper daggers and occasional flat celts were placed in the magnificent corbelled passage tombs of Alcalá, copper objects also occur in the cists, among them, significantly enough, Palmella points,[36] and in one case callaïs beads.[37] (Fig. 7.)

FIG. 7. Megalithic cists, Odemira and Milfontes, Algarve (1/40). (after da Veiga)

Åberg is, however, far more judicious than most writers on the megalithic civilization of Iberia and admits that he remains

a little circumspect of the conclusions to which M. Bosch Gimpera has arrived.

Despite his obvious affection for the megalithic evolution of Montelius and Cartailhac he yet must admit

that the culture with which we are dealing here, represents a period the duration of which is relatively short.[38]

It becomes transparent therefore that the great galleries and cupolas of Algarve, Huelva, Andalucia and Almeria, the rock-cut tombs of Palmella, and the passage dolmens of central Portugal and western Spain are virtually contemporaneous. The smaller passage dolmens have a poorer but not earlier furniture; they represent a "poorer element of the population" or, in other words, a provincial degradation typical of peripheral areas.

We have now to consider the alleged priority of the closed dolmen in which, it is assumed, is to be found the genesis of the megalithic idea. There is, in the first place, every reason to regard the originally free standing dolmen as a myth; no furniture has ever been recovered from these exposed chambers, and Leeds claims that traces of tumuli are to be found

[35] Correia, V., El Neolitico de Pavia. Com. invest. pal. y preh., No. 27, 1921, p. 71, and fig. 55.

[36] e.g., the cist necropolis of Odemira, Villa Nova, Serro de Eira da Estrada etc., Estacio de Veiga, Antiquedades monumentaes do Algarve, 1886–91, 4, pp. 112–140. Plates 11–13.

[37] Maudinheiro. Estacio de Veiga, op. cit., 4, p. 120, Plate 13.

[38] Åberg, op. cit., p. 115.

round many, while others are known to have been previously covered by a mound both in north Portugal and northeastern Spain.[39] There is little doubt, as Cartailhac realized long ago, that the free-standing dolmen is a ruin and that all megalithic chambers were originally concealed in a tumulus. It follows that the ingenious derivation of the passage dolmen from the free-standing dolmen consequent on the erection of a tumulus, loses its theoretic force. It must also be realized that many of the apparently simple dolmenic ruins may often be the relics of destroyed passage dolmens, for a closing slab on the fourth side is rarely found and Leeds has even gone so far as to account for this by suggesting an unclosed three-sided type of dolmen.[40] Finally, closed dolmens are sporadic in Portugal, where this alleged type is found in close proximity to passage dolmens.

In north Spain—Galicia, the Basque province, the Spanish Pyrenees, and northern Catalonia—rectangular closed dolmens are well-known.[41] But they are not early; their grave contents are similar to those of the passage dolmens in the same areas and in the East, because of their undoubted "chalcolithic" features, are frequently described as cists.[42]

The claim that megalithic architecture originated in Iberia with a simple, closed, and probably freestanding chamber relies entirely therfore on the sporadic and ruined tombs of north Portugal from which practically no furniture has been recovered. These tombs are assumed to be early, in deference to the Scandinavian sequence, although small closed chambers equally "primitive" in construction are known to be late further east in the Pyrenean culture.

The geographic distribution of the various tomb types carries us a stage further in the problem. The focal points of the "copper age" civilization of Iberia lie in the south. The magnificent tombs whether rock-cut, megalithic or corbelled, are found, with very few exceptions, in the southern provinces of Portugal and in southern Spain (Andalucia and Granada).

Leeds distinguishes the finer monuments from the smaller passage dolmens, referring to the former as "megalithic tombs." He notes that they are frequently subterranean, i.e. have been excavated in a hillside. From the entrance there is a descending ramp, which occupies the outer part of the

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[39] Leeds, op. cit., p. 202.

[40] ibid., p. 202.

[41] Bosch Gimpera, P. Prehistorica Catalana, Encyc. Cat. p. 107 ff.; Pericot y Garcia, La civilisation megalitica catalana, Barcelona, 1925.

[42] Cf. Leeds, op. cit., p. 230.

gallery. There is not, however, an absolute distinction between these monuments and the surface passage-dolmens. Many intermediate forms, partly buried and partly covered by a tumulus are known.[43] Moreover, certain very fine and massive monuments certainly of this class were constructed above ground level, e.g. dolmen de Soto.[44] These tombs are generally of great size and elaborate construction. The forms of chamber are varied: polygonal, rectangular, circular. Both the megalithic and drystone walling are employed, often within a single monument and the circular chambers are domed by means of corbelling. In the great necropolis of Alcalá, Algarve, some of the tombs are almost entirely megalithic, while others are carried out in ashlar walling.[45] A similar juxtaposition of megalithic and corbelled types is found at Los Millares, Almeria, in the southeast.[46]

The smaller Portuguese passage dolmens which are as a rule of comparatively rough construction, and for which little or no excavation was undertaken, are more remote in geographical position occurring in greatest numbers in central and north Portugal.[47] Their furniture, although poorer, prohibits any attempt to date them appreciably earlier than the large "megalithic tombs" of the south, for they frequently contain pottery and votive objects of the same type as the southern tombs, e.g. schist plaques and croziers.

The alleged prototypes of this architecture, the "simple dolmen" and passage dolmens with very short galleries, are still more remote. They do not occur in the south and are rare in central Portugal. They are found, as we have already noted, in Northern Portugal, Galicia, the Basque province, Navarra and Catalonia. These "primitive" forms are not concentrated on a limited area but span the base of the peninsula from west to east and are associated with small passage dolmens and undoubtedly degenerate covered galleries.

Several conclusions can now be suggested. In the first place, the megalithic tombs of the Iberian peninsula fail to show that slow elaboration of grave goods which the theory of local origin and development would expect. The less imposing tombs have the unfortunate habit of yielding objects typical of the great southern centres and cannot legitimately be dated early. Secondly, the quality of megalithic construction deteriorates as

[43] Leeds, op. cit., pp. 204, 205.

[44] Obermaier, H., El Dolmen de Soto, Huelva, Boletin de la Soc. Esp. de Excursiones, 32, p. 1 ff. and figs.

[45] Estacia de Veiga, Antiguidades monumentaes do Algarve, 1, p. 248, 3 p. 137.

[46] Siret, L'Espagne préhistorique, Rev. Quest. Scientifiques, 34, 1893, p. 522.

[47] Leeds, op. cit., p. 213.

one passes northward in the peninsula and the possibility immediately suggests itself that the classical typology begins at the wrong end, that the history of megalithic construction in Spain is, in the main, one of degeneration. This would explain why the megalithic monuments of the north, in Spain and Portugal alike, are of less elaborate construction, and would at the same time account for the occurrence in the Catalan tombs of objects typologically late. It would appear, therefore, that the traditional typology is an example of the frequent mistaking of the degraded for the primitive. Leeds admits that the "evolutionary" sequence raises great difficulties, that the problem of distribution

> is in no way simplified by a survey of the material known up to the present time. Indeed it would seem to be rendered even more difficult than before.[48]

There are indeed insuperable difficulties. If the megalithic tomb evolved in western Iberia from a simple closed chamber to a large galleried tomb, partly excavated underground, and developing variants with corbelled vaults and rock-cut analogues, it is strange that there should be an almost complete geographical separation between the first and last stages in the development.

Finally, if the simple dolmens and small galleries are at the beginning of the series, their furniture should be homogeneous and fairly uniform; but there is actually a more considerable variation between the furniture of the various groups of small dolmens, passage dolmens and galleries in the north, i.e. between the Catalan, Basque, Galician and north Portuguese, than between the grave goods of the great megalithic tombs in the south from the Tagus to Almeria. Between the southern centres, considering the vigor of their civilization, there is an astonishing uniformity; Siret and Déchelette[49] long ago pointed out their essential synchronism.

The affinities of the more northern Portuguese passage dolmens are with the western group of megalithic tombs. This is evidenced above all by the distribution of schist plaques and croziers. The Catalan monuments, on the other hand, dominantly reflect the Almerian and western Mediterranean cultures with their greater wealth of metal objects, poverty of polished tools, and distinctive types of bell beaker ornamentation.

If, as Leeds[50] and Childe[51] have claimed, the Catalan megaliths are more closely related to the trans-Pyrenean cultures of southeastern France, it would follow that the polygonal dolmens of northwestern

[48] Op. cit., p. 225.
[49] Rev. Arch., 1908, p. 219 ff.
[50] Op. cit.
[51] Dawn, p. 277–278.

Iberia (N. Portugal and Galicia) and the square chambers of the northeast represent architectural degeneration in different areas and have no direct typological relationship to one another, while the associated grave furniture is likewise derived from distinct proximate sources.

If the results of this analysis are accepted we must regard the Iberian megalithic culture as first developing in two related southern centres, Southern Portugal, Huelva and Andalucia in the southwest and Almeria and eastern Granada in the southeast. (See Fig. 4, page 28).

While tomb construction with rough unshaped but small rock material built up without the use of mortar (dry-stone or ashlar walling) is elaborately developed in both areas, the use of large, truly megalithic blocks, is more extensively developed in the west and that, moreover, in the lesser and more remote centres from which the furniture is less rich, especially in metals. There are also found in the western area groups of rock-cut tombs of which those at Palmella are the most famous. These sepulchres were hewn in a soft rockface from which a passage often widening out into one or more bulging antechambers leads to a circular chamber. This form as at Alapraia (Cascaes) and Folha de Barradas (Cintra) and Palmella, is very uniform and was executed elsewhere in megalithic blocks, e.g. Ordem, (Pavia).[52] It should also be realized that the polygonal chamber of the western passage dolmen is merely the angularization of the circular chamber of the drywalled and rock-cut tombs consequent on the use of a few large flat-faced megalithic slabs. Since the evidence has clearly indicated that megalithic construction degenerated in the more northern parts of the peninsula it would appear that the circular chamber, frequently provided with smaller side chambers and approached by a long corridor was the original Iberian type. It was executed by excavation in soft rock, by construction in ashlar walling covered by a tumulus, thus imitating a subterranean tomb, and again in megalithic blocks which afforded solidity without demanding the same care in construction as the corbelled tomb, but at the same time limited the scope of the architect on account of the clumsiness of the material. (Fig. 8.)

The close interrelations between the two southern centres have frequently been noted, but their distinctive traits should also be briefly described. In the southwestern area copper is not generally abundant. At Palmella there are found only a number of curious copper points splayed at the top into flat oval shapes somewhat resembling an unrolled racquet pin (fig. 9). These Palmella points have also been recovered from mega-

[52] Cp. Correia, V., El neolitico de Pavia, Com. Inv. Pal. y. Preh, 27, 1921, p. 63 ff and figs. 50, 56–58.

lithic tombs in the southwest[53] and at Los Millares in the east. In the corbelled tombs of Alcalá, however, flat copper celts and tanged daggers are also numerous. (Fig. 10.) The flintwork is throughout of very high quality. Pressure-flaked arrowheads, mitriform and triangular untanged

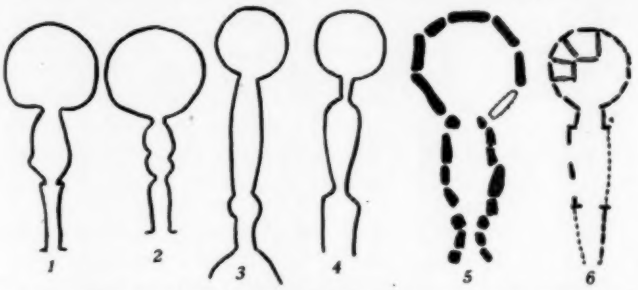

FIG. 8. Rock-cut tombs and their megalithic counterparts in S. W. Iberia. 1, 2, Palmella; 3, Alapraia (Cascaes); 4, Folha de Barradas (Cintra); 5, Ordem (Cascaes); 6, Marcella (Algarve). (1, 3, 4, 5 after Correia, 2, 6 after Cartailhac. Scales not uniform).

forms with long thin barbs are most characteristic (fig. 11,1-5). These arrowheads do not extend into the northern Portuguese area where the flintwork is characteristically microlithic, triangles and trapezes again indicating the intrusion of the southern culture into an area of surviving epipalaeolithic groups.

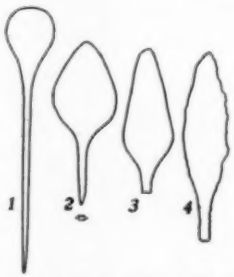

FIG. 9. Copper points, Palmella (1/4). (after Åberg)

Finely shaped polished axes of greenstone, diorite etc., whose wider relations will be considered later, are concentrated in the south. Bone but-

[53] E.g., from the ruined passaged dolmen adjacent to the dolmen de Soto. Cf. Obermaier, H. Dolmen de Soto, p.

tons with V-perforation, ornaments and occasional small receptacles of stone, are among the objects indicating the direction whence came much of the inspiration of this culture. But most characteristic and essentially

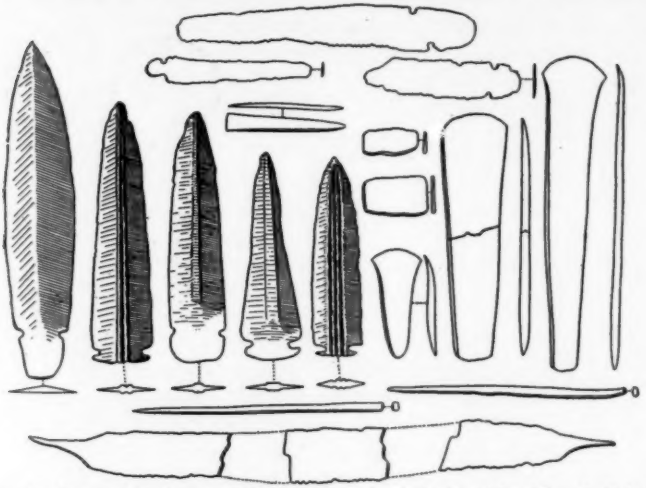

FIG. 10. Copper tools from corbeled tomb, no. 3, Alcalá (c. 1/4). (after de Veiga).

native, are the schist plaques and croziers carefully decorated with incised rectilinear and occasionally anthropomorphic designs. The schist plaque

FIG. 11. Iberian arrowpoints. 1–5, Alcalá (1/1) 6, 7 Los Millares (1/2).

is indeed the "type ornament" of the southwestern province, it extends rarely and in poor specimens into northern Portugal. Occasional rough plaques are found in Almeria but, although of the same family, they are

clearly distinct from the southwestern type. Cylindrical "idols" of stone or bone with very degraded incised face symbols, or simple carved knobs on top are also characteristic of this area and distinct from the "phalange" idols made from animal bones which are found in Almeria. Beads of the light green stone generally known as callaïs were used abundantly; they appear to be concentrated in the lower Tagus region, for nearly eight hundred have been found in the tombs of the province of Estramadura, nearly four hundred in Alemtejo and over ninety further south in Algarve. No less than 286 were recovered from three of the tombs at Palmella and they have been obtained in large numbers from other individual tombs.[54]

Two distinct wares are associated with the tombs of this area. Especially characteristic of the Palmella tombs are a variety of forms suggesting the development and crystallization of the bell beaker form and ornament. The majority of the Palmella pots are more squat, more deeply constricted at the waist, and more pointed at the base, than is the standardized bell beaker which was so widely diffused throughout western Europe. (Fig. 12.)

FIG. 12. Palmella beakers. (after Cartailhac)

These and other forms of which hemispherical bowls are the most characteristic, are decorated with elaborate incised and "comb" designs. This ware is

[54] Personal communication from Miss. L. F. Chitty.

not confined to Palmella and such megalithic tombs as the passage dolmens of Seixo and Ordem and the corbelled tombs of Monge and San Martinho, but is found in cave burials extending over a considerable part of southwestern Spain (Estramadura and Andalucia) while a richly ornamented group of this ware was yielded by a cave find in central Spain (Ciempozuelos). (Figs. 13, 14.) In other tombs of which the Algarve groups are the most

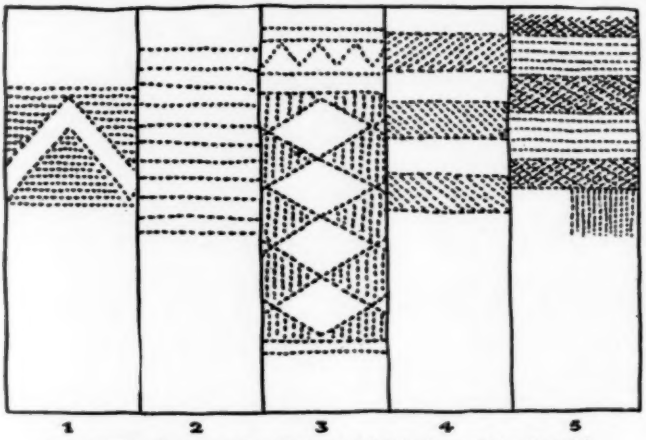

FIG. 13. Comb ornament on Portuguese bell beakers. (after Castillo)

magnificent, burnished unornamented pottery of distinct forms is found, globular pots and low carinated bowls being the most frequent types. Such ware has been frequently found to the exclusion of the Palmella type, e.g. in the chamber of Nora, but it is difficult to follow Bosch Gimpera's claim that it is clearly later in date[55] since, as Åberg[56] points out, so many other elements are found in association with both wares e.g. schist plaques, marble idols, copper points etc. Bosch Gimpera considers that the later date of the Alcalá and Marcella tombs is further indicated by the greater abundance of copper objects, flat celts, and even arrowheads. If these are a consequence of Almerian influence, as he suggests, some lapse of time may be implied, but Algarve itself is particularly rich in copper ores and ancient workings are indicated in the vicinity of the megalithic concentration in the maps of Estacio da Veiga, while the design of Marcella is a megalithic homology to the rock cut tombs of Palmella, etc.

[55] L'Anthropologie 35, 1925, p. 419.
[56] Åberg, op. cit., p. 114.

The megaliths in central and northern Portugal are of smaller and less elaborate construction. Stone axes are but roughly polished and the fine

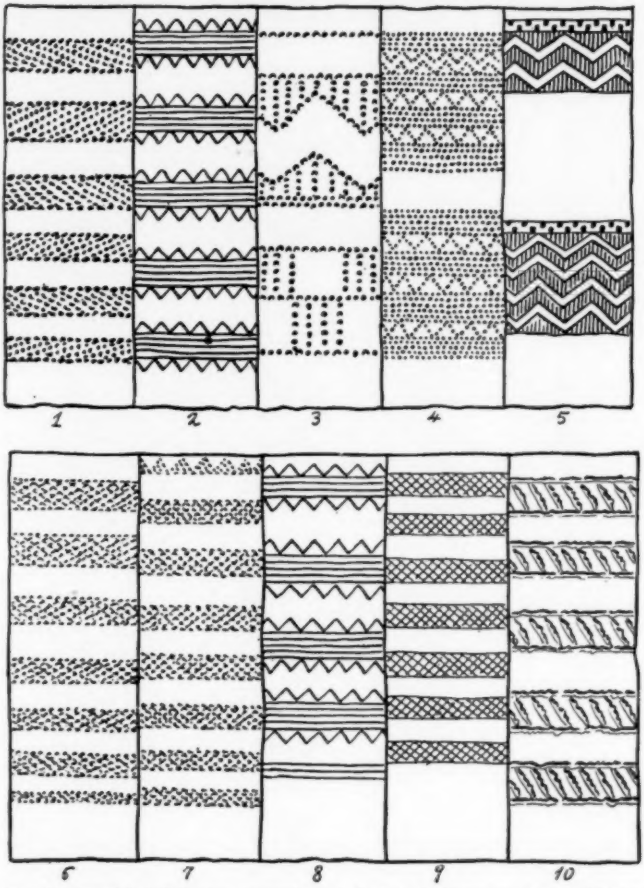

FIG. 14. Spanish bell beaker decoration. 1, 3, 4, 5, 7, Carmona, etc., Andalucia; 2, 6, 8, 9, 10 Los Millares, etc., Almeria. (after Castillo)

flint work of the south is lacking. Palmella pottery does not occur but the forms show relations with the unornamented wares of the south. The

schist plaque thins out rapidly in Alemtejo but callaïs and other beads are numerous in the tombs of the central Portuguese area.

The extensive excavations of the Sirets have yielded abundant material for the delineation of the culture of southeastern Iberia, which is concentrated especially in Almeria and eastern Granada; extensive villages and megalithic cemeteries have been explored, the station of Los Millares is especially remarkable, a large settlement occupied a bluff overlooking the Andarax river, a deep ditch cutting off the sections that were not protected by the cliffs. Rectangular houses in dry stone walling occupied the site to which water was led by an aqueduct from a hillside spring. A group of "forts" overlook the village from neighboring hills. The cemetery which occupies the inner section of the bluff extends over a considerable area. Over a hundred tombs are disposed in small groups, some are quadrangular and of megalithic construction, but the majority have circular corbelled

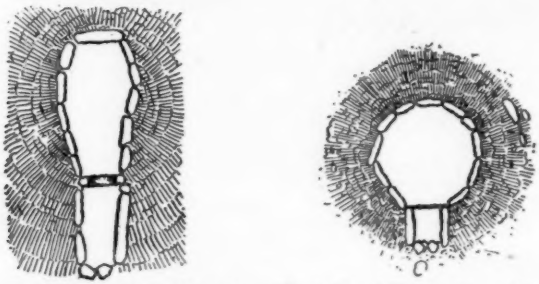

FIG. 15. Los Millares, Megalithic gallery (Tomb 8) and Tomb with corbeled chamber (no. 2). Note the holed-stone entry in tomb 8. (after Siret, no scale given)

chambers of dry stone walling. (Fig. 15.) Siret describes the corbelled tombs as follows:

the chambers are generally three to five metres in diameter, occasionally six. The walls are frequently lined with (megalithic) schist slabs to the height of a metre on which traces of plaster and paintings are found . . . . . The vaults and walls of construction would be about a metre thick but they cannot be distinguished from the rest of the mound which surrounds them. A single or double ring of upright stones retains the earth of the mound . . . . . On one side, generally that facing the sea, i.e. the east . . . . the wall of the chamber is pierced by a passage way which is frequently divided into a series of antechambers by other doors. The passage is constructed with upright slabs or dry stone, the roof is of flat slabs or corbelled. The portals are built of a frame of slabs or by a single holed

stone . . . . . The passage is entered by descending two or three steps . . . . . Some tombs are partly and others entirely buried in the earth.[57]

The burials in these chambers may be as great as one hundred. Although traces of partially burned bone and cloth are occasionally found, inhumation is the rule.[58] (Figs. 16, 17.)

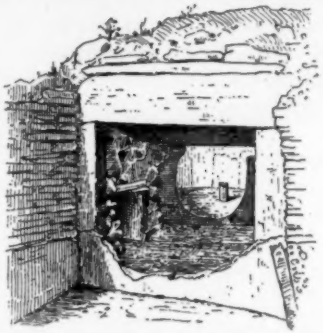

FIG. 16. Los Millares, entrance to Tomb 17. Note the entrance to a lateral chamber at the left of the antechamber, the holed-stone entry to the main chamber, and the broken schist pillar which supported the dome. (after Siret)

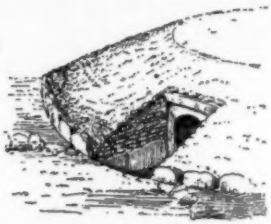

FIG. 17. Los Millares, Restoration of the entrance to a tomb. Note the sunken forecourt and the megalithic retaining wall. (after Siret)

Similar settlements are known at Almizaraque and Las Canteras in the same immediate region. Other cemeteries are found further west at Belmonte, Purcherra, and Gor.

The furniture is extremely rich. Copper is more abundant than in the west, flat celts, daggers and awls, pincers and pins, are standard tools, and

[57] Siret, L. R.Q.S., Bruxelles, 34, 1893, p. 522 ff.
[58] Ibid.

the implements of polished stone are correspondingly rare and insignificant. (Fig. 18.) The flint work (knives, daggers, and arrowheads) is as magnificent as in the west; lozenges and mitriform, points of similar form and execution, are found in abundance. But there is also an extensive development of tanged points, which are rare in the western area. (Fig. 11,6-7.) Small stone pots, generally of alabaster, recall similar occasional finds in the west. e.g. at Palmella. Ornaments of amber, callaïs, amethyst and jet, and a dagger of hippopotamus ivory indicate the extensiveness of trade relations.

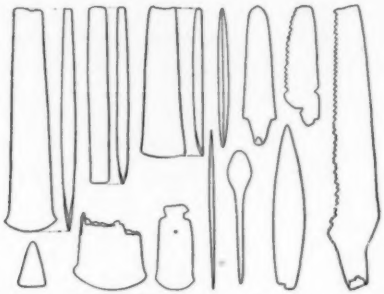

FIG. 18. Copper tools, Los Millares, etc., Almeria. (1/4) (after Siret)

The pottery again falls into two groups, but both wares are found together in the tombs. The one is richly ornamented with incised and comb decoration in which geometric, animal and ritualistic designs are found. In this group fall a number of bell beakers of fully developed form decorated very restrainedly in the combed style with parallel horizontal bands of oblique markings. (Fig. 14.) Other pottery is burnished but undecorated, the technique of manufacture being apparently similar to that of the corresponding western wares.

In the southeastern region other sites have been found which Siret and Bosch Gimpera attribute to earlier periods. At El Garcel and Trez Cabezos village sites yielded a variety of polished stone tools (axes, chisels, gouges) of diorite, fibrolite and greenstone with a burnished pottery. A small stone "violin" idol strongly reminiscent of Aegean forms (Early Minoan, Troy II etc.) is a remarkable feature at El Garcel. This "idol" is also known in the west, e.g. from the settlement of "El Castillo" near Pavia, Alemtejo, Portugal.[59] Arrowheads are completely lacking but numerous

[59] Correia, op. cit., p. 18.

microlithic flints, including characteristic Tardenoisean trapezes and triangles abound.

The village of Gerundia and the slab cist graves of Palaces, Puerto Blanco, and Velez Blanco[60] show a somewhat more elaborate culture, including callaïs beads, bracelets of pectunculus shell, copper pins and awls, while at Parazuelos and Campos copper celts and arrow points are abundant. Although it is possible that these sites record the elaboration of the Almerian civilization, it is yet equally probable that they represent outlying and minor settlements of the fully developed culture. The idols and ovoid pots suggest east and mid-Mediterranean sources; slag of copper ores was found at El Garcel[61] while the occurrence of Tardenoisean flint forms might well follow from the intrusion of Almerians among epipaleoithic aborigines. In any case these settlements do not afford prototypes for the megalithic chambers of Los Millares etc.; burials are in caves or slab-protected trenches.

The Almerian culture extended rapidly along the eastern shore of Spain, but megalithic construction did not accompany it here. In Murcia, Valencia, and Aragon, extending far up the Egro valley, trench and cave burials, and settlements yield fairly rich furniture of Almerian arrowheads, fibrolite axes, stone beads, together with occasional beakers and copper tools. In southeastern Catalonia (Tarragona, Barcelona and eastern Lerida) an important center developed. Pectunculus bracelets, callaïs beads and fine stone celts are found in the burials of this area in which megalithic construction, save for a menhir-like pillar indicating the site, is again generally absent. The abundance of trapezes and lack of arrowheads conform to the condition of Palaces and Puerto Blanco in the south, which implies for Bosch Gimpera that the Catalonian extension preceded the occupation of intervening country.

In the Pyrenean area of northeastern Catalonia, Navarra, and the Basque provinces, megalithic chambers (passage tombs, galleries, and small closed chambers) reappear abundantly. The abundance of copper and zoned beakers indicates Almeria as the dominant influence. But the relation may have been indirect, arriving via southern France, for, as Leeds has shown, the Pyrenean culture both in tomb form and furniture is homogeneous on both sides of the range and most closely related to the Provencal culture.[62] Bosch Gimpera regards the Pyrenean megaliths as derived from the west and points to the elaborate design, zigzags, bands of

[60] l'Anthropologie, 35, 1925, p. 432.

[61] de Motos, L'edad neolitico en Velez Blanco. Com. invest. pal. y. preh. No. 19.

[62] Leeds, E. T., op. cit., p. 230.

triangles etc. on beakers found in northeast Catalonia with bone buttons and prismatic plaques with V-perforation as indications of this source. But although our knowledge of the monuments further west is extremely inadequate, there is no reason to believe that these, any more than the north Portuguese tombs, bridge the gap between Catalonia and southwest Iberia and the V-pierced bone ornaments may well have their closest parallels in Sardinia. So that provisionally the isolated Pyrenean group is more safely to be linked with the neighboring culture in southeastern France, whose character will be discussed later.

There is no doubt, however, that southwestern influence penetrated this area for typical southwestern incrusted pottery with radial designs of the Palmella-Ciempozuelos type are found in cave burials in northern Catalonia,[63] and in a group of small galleries and caves in the district of Solsona in Lerida (north Catalonia). But with the latter group are found square V-pierced bone buttons, copper daggers, points, etc. and tanged arrow points related to southeastern forms and the culture is undoubtedly mixed.[64]

The Almerian and southwestern civilizations did not penetrate so freely into the central plateau of Iberia. Bosch Gimpera groups together as one culture the two very distinct provinces that are indicated by the pottery found in cave burials in this area. In the north, relief decoration by means of plastic bands, buttons etc., together with lines of irregular thumbnail impressions on the bands or rims, is found almost exclusively in a large series of cave finds. Regarding these as a local Iberian development, he considers that similar types in southern France indicate northern extension of Iberian Capsians, but as Poisson[65] points out, the distribution of this pottery in Spain forms a triangle based on the Pyrenees whose point extends southward only to Madrid. Not only does its distribution fail to coincide with the undoubtedly earlier centers of Capsian culture in Spain but it further suggests a trans-Pyrenean source for the style. Plastic ornament is a characteristic feature of the "neolithic" settlements of the continental interior, e.g. the western lake dwellings and the fortified stations of the middle Rhine. Forms related both to these and to the northern Iberian are recorded over the intervening areas in stations of the "Camp de Chassey" type and in caves in the Alpes Maritimes and the Central plateau of Lozère, Dordogne, and Ariège.[66] There can be little doubt there-

[63] E.g., Cova fonda de Salamo.

[64] Åberg, op. cit., p. 147 ff. for an admirable summary of the material of this region.

[65] Les Civilisations néolithiques et énéolithiques de la France, Rev. Anth. 38, 1928, p. 246.

fore that the north Spanish plastic ware represents a continental movement into the Iberian peninsula that was arrested and engulfed by later movements of the megalithic culture.

In the southern section of central Spain, cave finds of pottery are associated with polished stone axes, flintwork of southwestern and Almerian types and copper tools (flat celts, daggers, awls etc.). The pottery of this region is decorated with bands of incised lines, and zones and zigzags in the comb technique. These cave finds mingle with the megalithic tombs of western Andalucia, and in the vicinity of Carmona, a little east of Sevilla, a rich variety of bell beakers have been obtained from settlements, caves and megalithic tombs. The richness of the Andalucian material on the fringe of the megalithic area and the Ciempozuelos finds further north have led Bosch Gimpera and Castillo[67] to claim that the bell beaker style was elaborated here and introduced into the southwest from the central province. But the Palmella pottery would appear to offer an equally good typological series for the evolution of the bell beaker, while the varying richness of the cave finds, in pottery and other furniture, which is taken to indicate evolution from a simple neolithic to a copper age culture, more probably resulted through gradations in cultural remoteness from the southern centres.

The Bell Beaker

The bell beaker affords a remarkably valuable cultural index in the early cultures of Western Europe. Exceptionally standardized in form and ornamented in characteristic and unmistakable techniques it is distributed over a very wide area extending from the central Mediterranean to the English Channel. Characteristic throughout southern Portugal and Spain, extending in large numbers into the northeast, the earlier 'Atlantic' bell beaker is more abundant in Iberia than elsewhere. But although it is generally accepted that this crystallization of form and ornament took place in southern Iberia, and that the mature bell beaker, whether of western or central European form, is everywhere derived from the Iberian, its early development is nevertheless obscure. Siret and others have suggested that its shape and ornament are derived from basketry prototypes. This explanation has been widely accepted and more recently Childe has carried it a stage further. Remarking the general similarity to the earliest known Egyptian pottery—the beakers of the Badari culture

[66] Cf. Schuckhardt, C. West Europa als alter Kultur kreis. 1913, cp. Poisson, op. cit., pp. 250–252.

[67] Alberto del Castillo, La ceramica incisa de la cultura de las cuevas de la peninsula Ibérica, Barcelona, 1922.

—he suggests that both were produced in imitation of archaic esparto grass basketry forms in use in Africa from the remote past until the present day. Surviving on the southern fringes of the Sahara, this form either in basketry or already translated into pottery formed one element of a slow cultural drift which introduced shell bracelets, disc beads, and later hollow based arrowheads of African types into northeast Africa and Iberia.[68]

Bosch Gimpera and Castillo while not denying the influence of basketry in both form and ornament have claimed to have identified the actual scene of the elaboration of the bell beaker in the region of Carmona, insisting that it and other forms, together with comb and incrusted decoration used there, were strictly autochthonous and only later grafted on to the megalithic culture. But the pottery of the Carmona region is derived from both megalithic tombs and cave finds on the fringe of the southwestern megalithic centre. With the exception of the Ciempozuelos cave finds further north the richest ornament and greatest variety of forms are associated directly with megalithic tombs[69] and it is only on the assumption, which we have already questioned, that the megalithic culture developed slowly from rude beginnings in north Portugal, that this pottery can be regarded as originally dissociated from the southern cultures. But the character of the wares of the Carmona region and of the Palmella tombs undoubtedly afford some clue to the development of the beaker. The tall slender bell beaker, decorated in bands of 'combed" ribbons, zigzags or triangles, is not characteristic of these wares. The dominant forms are hemispherical shapes and low, waisted bowls with a smoothed carination (figs.12), which indeed are squat compressed bell beakers. At Palmella a whole series of gradations from the squatter form to normal bell beaker shape can be observed, and it is immediately suggested that the bell beaker may well have developed in western Iberia as Bosch Gimpera claims, by a heightening of the low, waisted carinated bowl. The elaborate radial patterns and incrusted technique of the Carmona, Palmella, and Ciempozuelos bowls and beakers are remote from basketry patterns, although such influence may have come in later on as a formative influence in the decoration of horizontal ribbons, zigzags etc. The carinated bowl, both decorated and burnished,

[68] Childe, Most Ancient East pp. 232ff.

[69] The tombs and stations of this region have been excavated by Bonsor but the data are incompletely published; see Bonsor, O. Les colonies agricoles pre-romaine de la vallée du Bétis, Rev. Arch, 1899. Åberg, op. cit. pp. 120 ff. gives a brief summary based on a more recent examination of the Bonsor collections. Castillo, La ceramica incisa de a cultura de las cuevas . . . . , 1922, undertakes a detailed analysis of the pottery of central Spain, suggesting the development of bell beaker ornament in this region from early incised and 'boquique' cave wares.

is almost as widely distributed in Atlantic Europe as the beaker itself. It is a leading tomb ware in Brittany, appears with ornament of southern origin, "combed triangles," "oculi" etc. in Denmark, and has moreover archaic predecessors in clay and stone in the eastern Mediterranean. It would therefore appear unnecessary to lean heavily on the uncertainties of basketry prototypes, but to accept the evidence of the varying forms in Iberia itself as indicating the development and crystallization of the bell beaker from the low, waisted bowl.

In its later form the Iberian beaker is surprisingly uniform in shape and range of ornament. In Almeria a very restrained ornament of incised and combed ribbons and triangles was almost exclusively used, and beakers of precisely this type appear in areas so far apart as southern Italy and the Channel Islands.

The Ancestry of the Megalithic Culture

If the Iberian megalithic culture was already at a high level of achievement in the earliest centers of the south, the problem of its origin is pushed one stage further back and must be sought, not in the degraded megaliths of northern Portugal but in some higher civilization elsewhere. Such an inquiry raises extremely complicated problems not only on account of the gaps in our knowledge but also from the baffling diversity of clues.

Explanation of the western megalithic cultures in terms of the civilization of the Ancient East have long been advocated and controverted as a "*mirage orientale*," and the obscurity of the problem has been heightened by the conflict of data and hypothesis. Serious difficulties arise since parallels in tomb form and items of furniture are found in eastern centers which are widely separated in space and time, while no single cultural province can be claimed as the source of even the greater part of the Iberian culture.

The passage chamber tomb which is the primary and original "megalithic" type in the west was characteristic in all the early centers of higher civilization. The rock-cut tombs of the Old Kingdom in Egypt and the excavated *dromos* tombs of Early and Middle Minoan Crete are obviously parallel in plan and function and the fact that many of the finest Iberian tombs are excavated in the ground is of great importance. The corbelled chamber may also be related directly to Aegean prototypes. The famous Mycenean "*tholoi*" are later than the Iberian and Déchelette[70] has shown

[70] Essai sur la chronologie préhistorique dans la peninsule ibérique, Rev. Arch., XII' 1908, p. 219.

the impossibility of Sirert's[71] attempt to synchronize Los Millares with the late Minoan Bronze Age culture of Mycenae. But the corbelled beehive was used as a tomb in Crete at least as early as the later part of the Early Minoan period. The Messaran vaults,[72] although not direct prototypes for Iberian forms, are nevertheless significant in the technique of their construction. In other early Aegean cultures, slablined cists which accompany the megalithic tombs in the west, were used as sepulchres for very long periods.

The furniture, especially in Almeria, affords many if isolated Aegean parallels. The El Garcel type of violin idol resembles those of Troy I and II[73] and belongs to the great family of east Mediterranean figurines. The Almizaraque figurine also has close parallels in lead at Troy II[74] and in marble in the Cyclades. The "oculi" ornament incised on Los Millares[75] pottery and reappearing sporadically as far north as Denmark, has early Troadic prototypes[76] (fig. 19) and the ivory pommel (?) knob from Nora, Algarve,[77] is also of early Trojan form.

Analogies from Crete include the stone and wooden pillar supports in Los Millares "beehives,"[78] the horns of consecration" from Campos and further west at Campo Real.[79] The alabaster pots of Los Millares recall Cycladic pyxides[80] and are themselves related to small stone jars in the southwest, e.g., at Palmella.

But the magnificant flintwork of the arrowheads, on the other hand, is not Aegean in its associations. Typologically it is related to that of predynastic Egypt, where the mitriform arrowhead was developed as early as Badarian times. Nilotic prototypes have also been suggested for the schist plaques and croziers of the southwest.[81]

The tanged daggers and flat copper celts of Almeria and Algarve are of the forms that were being made in Egypt, Troy, and Cyprus in the early part of the third millennium.

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[71] Siret, L. Orientaux et Occidentaux en Espagne. Rev. Quest. Sci. (extract), 1907, *and* Questions de Chronologie, Paris, 1913.

[72] Xanthoudides, The vaulted tombs of Messarra, 1924.

[73] Cf. Siret, L. L'Espagne préhistorique, R.Q.S., 34, p. 515 and figs. 156–8.

[74] Déchelette, op. cit., p. 239.

[75] Siret, L'Espagne préhistorique, p. 221–225.

[76] Cf. Dechelette, op. cit., p. 225.

[77] Cartailhac, fig., 226.

[78] Dechelette, op. cit., p. 239.

[79] Bonsor, Colonies agricoles, p. 302, figs., 11–15.

[80] Dechelette, op. cit., p. 239.

[81] Cf. Dechelette, op. cit., p. 229.

The low carinated bowls that are so prominent in the undecorated pottery of the west frequently recall the beautiful stone bowls of Late Predynastic Egypt and Early Minoan Crete.

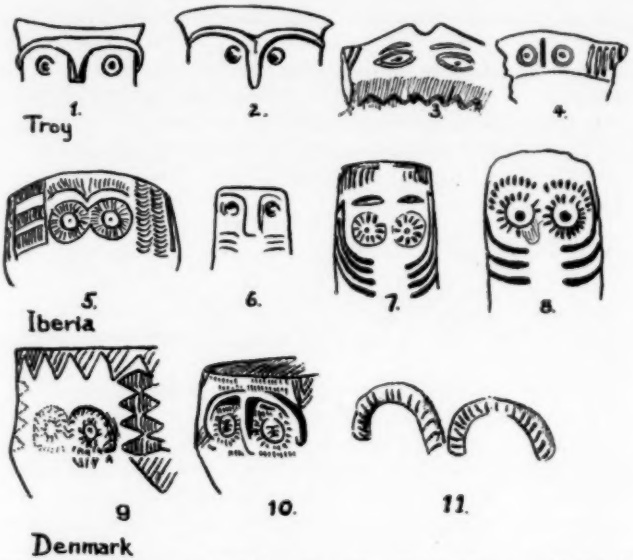

FIG. 19. Oculi ornament. 1, 2, Face Urns, Troy II (after Perrot and Chipiez); 3, 4, Incised designs on sherds from Troy I (after Schliemann); 5, Incised designs on bowl, Los Millares (after Siret) 6, Head of schist plague, Portugal (after Siret); 7, Head of cylindrical marble idol, Madrid Museum (after Siret); 8, Head of cylindrical marble idol, Algarve, Portugal (after Åberg); 9, Incised ornament on bowl from the passage-dolmen Gundestrup (after Nordmann); 10, Incised and plastic ornament on bowl from passage-dolmen of Kallup, Seeland (after Reallexikon der Vorgeschichte); 11, Plastic ornament on another bowl from Gundestrup. (after Nordmann)

Sophus Müller has claimed that all the techniques and decorative elements employed in the finer wares of the western megalithic cultures were developed at the eastern end of the Mediterranean. In the Egyptian and Nubian wares of the Old Kingdom comb imprints, incrusted bands, triangles and diamonds, and the fine burnishing of black wares were fully developed and continued in use for long periods. Citing similar wares from Gezer (Palestine), he traces these ornamental styles through the

copper age cultures of Italy and the islands of the western Mediterranean.[82] Melida[83] has also shown remarkable similarities between the rich ornament of the southwest Iberian beakers and that of Old Kingdom painted and incrusted wares in Egypt.

Since all these miscellaneous parallels afforded by objects from the entire range of the early Iberian culture indicate very real links with the Eastern Mediterranean we should expect to find some mid-Mediterranean culture which acted as intermediary. But although the early civilizations of Southern Italy and Sicily betray immense indebtedness to the Aegean, they do not represent an incipient stage of the Iberian culture.

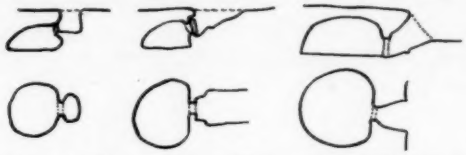

FIG. 20. Rock-cut tombs. 1, Sicily; 2, Pianosa; 3, Palmella. (after Cartailhac)

The Sicilian rock cut tombs (fig. 20) might be considered Iberian prototypes, and the V-pierced bone button, copper daggers, and celts may have reached Spain from the mid-Mediterranean but the most definite evidence of contact points in the reverse direction and is afforded by zoned bell beakers of Almerian type in Sicily and Italy. In Sardinia,[84] however, the tombs of a highly developed copper age culture afford evidence of a strong formative influence on the west. The extensive necropolis of galleried rock cut tombs at Anghelu Rugu[85] in the northwest of the islands and the cave finds of San Bartolomeo on the east have on the one hand afforded abundant evidence of Aegean influence. The wares of the lower strata of cave finds have been compared to Early Minoan types,[86] marble idols of late Early Cycladic type were found in three tombs at Angelhu Ruju, and much of the later pottery indicates an Aegean inspiration and reproduces Minoan forms, while the architecture of the tombs, with their multiple rock-hewn chambers, stepped-passage or pit entrance, anticella, pillars with carvings of bulls' heads, high prowed boats etc., show a dependence on eastern

[82] MSAN., 1920–24, pp. 228 ff. and literature there cited.

[83] O. Archeologo Português, 24, pp. 24 ff.

[84] Childe, Dawn, chap. 7, pp. 101 ff. gives a brief account of the Sardinian material.

[85] For the exploration of Anghelu Ruju by Taramelli see Notizie degli scavi di Antichita, Roma, 1, 104, p. 305 ff. and Monumenti Antichi, 19, p. 409 ff.

[86] Childe, Dawn, p. 102.

funerary custom which are inexplicable on the basis of sporadic "trading" relations with the east. The grave goods of these Sardinian tombs also contain objects characteristic of the west, of which the bell beaker is the most conspicuous. But while some items clearly indicate reflex movements from Iberia, others such as the polypod bowls, V-pierced buttons, spool beads and spheroid mace-heads, tanged daggers, and pectunculus shell bracelets and perforated whetstones more probably indicate the proximate source of much of the Iberian and southern French megalithic cultures.[87] The rock cut tombs of the Balearics and the galleries of Provence are most probably derived from the Sardinian types (figs. 21, 22, 23).

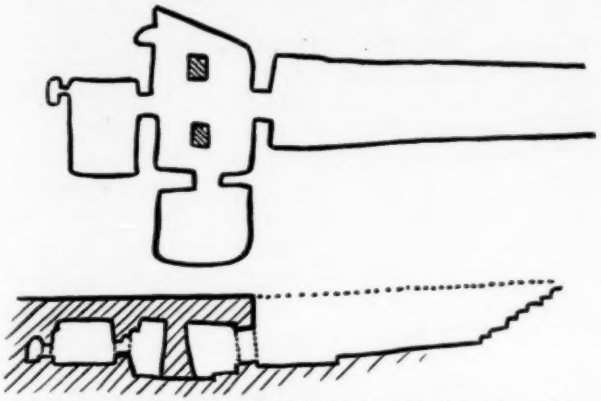

FIG. 21. Angheln Ruju, Sardinia, tomb 20 bis 1/150. (after Taramelli)

The tombs of Angelhu Ruju, and the Giants Graves which reproduce them in megalithic architecture, were, however, in use for very long periods of time, objects of Bronze Age and later periods have been recovered, and grave goods of earlier periods have doubtless been removed or scattered in the course of later interments.

The picture of the early civilization of the island is therefore blurred and often uncertain, but the intermediacy of tomb form and the evidence of grave goods undoubtedly indicate that the continuity between the higher civilizations of the east and the megalithic culture is to be sought in the blending of cultures in the early settlements of the western Mediterranean.

[87] Cf. Childe, Dawn, p. 106 who suggests that much Iberian influence in southern France came via the Sardinian culture.

Despite the multiplicity of eastern prototypes, the chronology of the Iberian culture remains uncertain. The bell beaker affords the most definite clue, for it appears fully developed in the Villafrati culture of

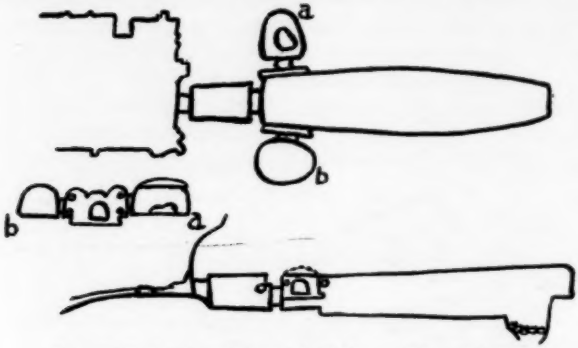

FIG. 22. Rock-cut, St. Vincent de Majorca. (after Cartailhac)

Sicily which, as Childe has shown,[88] must be dated to the second half of the third millennium. The Early Minoan and Trojan parallels to Iberian objects range over the entire period of the third millennium, while the

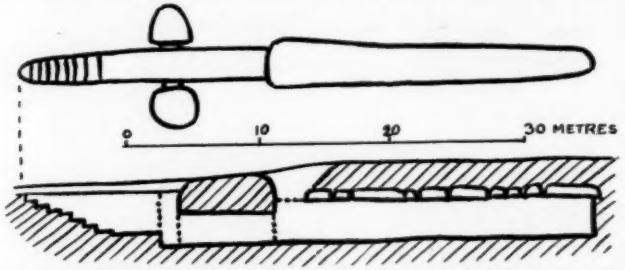

FIG. 23. Grotte des Fées, near Arles, Provence (after Cazalis de Fondouce.)

evidence of ceramic ornament, if given full weight, indicates Egyptian influence dating back to the beginning of the third millennium. The higher cultures of southern Iberia were probably established by 2500 B.C. The halberds and the segmented beads of El Argar clearly indicate that the earlier Almerian culture had ended before 1600 B.C.; for the paste beads

[88] Dawn, pp. 99–100.

are of Middle Minoan III date in Crete and an Iberian halberd was found in a shaft grave of that period at Mycenae. We are left therefore with a period of eight or nine hundred years, at the end of the third and the beginning of the second millenium, during which the Iberian peninsula exerted a paramount influence in the colonization and traffic of the Atlantic littoral.[89]

Southern France

That the early cultural developments in Iberia were related to the appearance of civilized peoples throughout western Europe has long been obvious from the wide and correlated distribution of such fundamental elements as stone tomb forms, polished axes of diorite and other hard stone, and distinctive types of pottery. But the occurrence in various areas of unique and specialized ornaments and utensils enables us to define relations more exactly. The range of distributions of specific forms of tombs, of callaïs beads, of bell beakers of various types, etc. affords a basis for the more exact delineation of lines of expansion, of areas of colonization, and of the reflex traffic which followed the establishment of new centers.

Iberia was undoubtedly the major focus from which the framework of early Atlantic civilization was extended, and the several lines of expansion may be followed in our analysis. Some influence was, as we have seen, undoubtedly transmitted back into the central Mediterranean, as is evidenced by the Almerian beakers of Sardinia and Sicily and the occasional megaliths of S. Italy. Established in southern France in the region of the Rhone delta, the megalithic culture also penetrated extensively the interior of western Europe. The Provençal culture crossed the Cevennes and extended into the barren plateau of southern France. Across the low ranges at the head of the Rhone valley another centre was established in the flint-bearing chalk ridges of the Paris basin. In this area the survival of Campignyans and the intrusion of continental elements combined with the strange environment to produce a variant culture in which Iberian traits are nevertheless obtrusive.

The megalithic tombs of southeastern France extend from the low hills overlooking the Rhone delta up into the Cevennes and southern section of the central massif on the west and into the Alpine fringe on the east. Subterranean and slab-roofed galleries, corbelled chambers, large closed "dolmens," smaller dolmenic cists, and natural caves were all used for interment in this region.

[89] This chronology is confirmed in Scandinavia where Danubian elements in the grave goods have enabled Childe to date the dolmen period from about 2500 to 2200 B.C. and the passage graves from 2200 to 1650 B.C. cf. Dawn, p. 212.

The group of four large tombs in Provence near Arles are probably among the earliest in the area.[90] These so-called "Grottes" des Fées, de Bounias, de Source and de Castellet, are long, relatively narrow galleries, sometimes with side chambers, excavated in the soft rock of the low hills and roofed with megalithic slabs. The Grotte des Fées, the largest, is nearly twenty-five metres long and four metres wide at the widest point of the main chamber (fig. 23). Source, the smallest, is 16.6 m long and considerably larger than the average passage tomb. From Castellet alone a relatively complete grave furniture has been obtained. In addition to an abundant flint work (arrow heads and spear points) and a zoned bell beaker of "Almerian" type, over a hundred discoid callaïs beads and numerous olive-shaped beads, one of callaïs and one of gold were recovered. The tanged copper dagger and V-pierced bone button found at Bounias supplement the evidence from Castellet and indicate the close relations with Iberia and the western Mediterranean.[91]

Bosch Gimpera[92] assumes the Provençal culture to be an extension of the northeast Catalonian. But the tombs are far more elaborate than anything found in that area and Leeds has, as we have seen, reversed the process and shown the strong probability that the megaliths of Pyrenean Spain represent a late movement back into the Peninsula from France.

Moreover, detailed structural analogies with the Provençal galleries are found in the rock-cut tombs of the Balearics. The similarity of the St. Vincent tomb, Majorca, and the Grotte des Fées near Arles has been repeatedly cited.[93] The Balearics were themselves in intimate contact with both Almeria and the copper age culture of Sardinia that was responsible for the elaborate rock-cut tombs of Angelhu Ruju. Childe[94] has already suggested that the bell beaker reached southern France not directly from Almeria but through the activities of mariners of the Sardinian culture. He would in this way also account for the prismatic V-pierced plaques that accompany the beakers in northern Catalonia. But although the archaeological record from the Balearics is very inadequate, the evidence of tomb form points rather to this more western island group as the immediate source of the greater part of the Provençal culture. The finely worked

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[90] Cazalis de Fondouce, Les allées-couvertes de Provence, 2 vols., 1873.

[91] Déchelette, Manuel d'Archéologie, 1, p. 405 ff., summarizes the data and gives a short bibliography for this group of tombs.

[92] Rev. Anth., 1925, p. 349, and Reallexikon der Vorgeschichte, Frankreich, 14, 24 ff. which at the same time affords the most systematic general account of the French cultures.

[93] Déchelette, Manuel, I, p. 419 and cp. Cartailhac, Les Ages Préhistoriques, p. 142.

[94] Dawn, p. 277.

callaïs beads, however, appear to be direct Iberian imports, and there can be little doubt that there was at this period long continued, if sporadic, intercourse berween all the major centres established in southeastern Spain, the Balearics, Sardinia, and southern France.

The Provençal galleries are unique in their area but a corbelled passage tomb of the same period occurs in the Cevennian fringe at Collorgues, Gard,[95] and the grave goods of the "dolmen" of Cranves far away in the Haute Savoie indicate the northeastern extension of this culture. Numerous rectangular dolmens, which may in some instances be degenerate galleries, trench graves, and cave burials yielding similar though poorer furniture extend into the mountain country on either side.[96] In these upland areas, especially in the heart of the southern massif, this culture lingered on for a very long period. The "dolmens" of Aveyron, relatively small box-like constructions occasionally with holed stone entries,[97] yield grave goods which indicate the gradual infiltration of Bronze Age types.[98] Trefoil and raquet pins of bronze betray central European contacts effected, according to Childe,[99] by the intrusive group who built the Bronze Age barrows of Savoy and Jura. But the helical copper bangles which first appeared somewhat earlier may be related to similar forms in use at El Argar, the bronze age culture that succeeded to Los Millares in Almeria. Other elements of the later furniture are bewildering. Slate palettes, segmented and phallic beads,[100] have East Mediterranean parallels at the end of the third millenium. The occurrence of such types in late tombs in association with iron beads and riveted daggers has never been satisfactorily explained.[101]

[95] Nicolas, Sepulture de Collorgues, A.F.A.S., 1889,2 pp. 629 ff.

[96] In Hérault, Gard, Ardèche, Lozère, Aveyron, etc. in the Massif to the west and in Var, Alpes Maritimes, Hautes Alpes etc. in the Alpine ranges to the east.

[97] Dechelette, I, p. 403.

[98] The long period indicated for the megalithic culture in southeastern France is divided by Bosch Gimpera into three stages of which the galleries of Arles, the dolmen of Stramousse (Alpes Maritimes) and the beehive Collorgues are typical of the first establishment of the culture. In the next "transitional" stage the bell beaker has disappeared but copper objects, including helical bangles and rhomboid points are more abundant e.g., Dolmen de Taurine, Aveyron. The final stage belongs to the full Bronze Age, e.g. Dolmens de la Liquisse, de Couriac etc. Aveyron. See Bosch Gimpera, Rev. Anth., 1925, pp. 346–355. An inventory of tombs and burials said to belong to the various stages is given and the literature relative to the area is well summarized.

[99] Dawn, p. 280.

[100] See especially Congrès Internationale d'anthropologie, Norwich meeting, 1868, p. 354 ff. and plate.

[101] Childe, Dawn, pp. 278 ff. briefly discusses this problem.

Further west in the northern foothills of the Pyrenees and extending almost to the Biscayan coast a culture of somewhat different aspect is found. Megalithic galleries, dolmenic cists and cave burials in this area have yielded a very uniform furniture characterized by bell beakers, finely polished celts occasionally of greenstone, flint daggers, callaïs and occasionally gold beads. Relations were apparently closest with the southeastern area in its first period. But several curious features appear in this culture. The major group of megaliths is found on the Plateau of Ger. Two galleries (Pouy Mayou and Pouy de la Halliade) were explored by Piette,[102] others to the north, of which Taillan yielded the most complete grave goods, had been previously excavated by Pothier.[103] La Halliade is the only angled gallery reported in southern France. This form is frequent in Brittany and was probably developed there. At La Halliade also a beaker decorated with true cord impressions occurs. This ornament, although found sporadically elsewhere, e.g., Domen de Cranves[104] is again best known in the Breton peninsula where tubular gold beads are also occasionally found. It would therefore seem that some movement from the northwest is indicated. But true cord impression is also found on two isolated beakers from northeastern Spain, i.e., from the "dolmen" of Pagobakoitza[105] near San Sebastian in the Basque country and from the passage dolmen of Puertas de Garcia Rodrigues, Coruna, Galicia.[106] Both are of the same type, zoned beakers with oblique "combed" ornament, but the horizontal bounding lines of the zones were found by cord impression. They are, however, distinct from the Breton and Halliade specimens, in which closely packed horizontal cord impressions cover the entire body of the beaker.

In addition to bell beakers, tripod and polypod bowls are found in Taillan, la Halliade, and elsewhere in this area. These bowls are quite un-Iberian, but somewhat similar forms occur in association with bell beakers in Sardinia (Anghelu Ruju and San Bartolomeo) to which Childe[107] looks for their source. Since, apart from the corded specimen, the beakers are of the mature zoned type characteristic of Almeria and the western Mediterranean, there can be little doubt that there was also intrusion from that area. But the culture of the southwestern area, established probably at the period of maximum activity, was short-lived. It neither lingered on

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[102] Piette, E. Note sur les tumulus de Bartres et d'Ossun, Mat. 1881, p. 522.
[103] Pothier, Les tumulus du Plateau de Ger, Paris, 1900.
[104] Åberg, op. cit., fig. 313*a*.
[105] Åberg, N., op. cit., p. 157.
[106] Bosch Gimpera, Arqueol. prerromana, p. 164 and idem, Reallexikon, 4, p. 349.
[107] Dawn, p. 106.

like that of Aveyron and the Cevennes, nor was it abruptly ended by an incursion of new peoples and no Bronze Age settlements or tombs are found in the area.

Galleries and Rock-cut Tombs of the Paris Basin

The megalithic tombs of the Paris basin (departments of Seine-et-Oise, Oise and Aisne) form a very specialized group of very uniform type. They are subterranean galleries, from seven to as much as fifteen metres in length, constructed in megalithic and drystone walling, without any covering mound. In general, a short and somewhat narrower ante-chamber precedes the long rectangular gallery and they are separated by a megalithic slab, in which a circular hole has been cut. Over half the galleries reported have holed stones and this trait is one of the most characteristic features of the group.[108] (Fig. 24.)

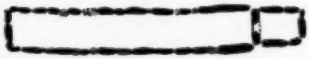

Fig. 24. The gallery of La Justice, Seine-et-Oise, length 18 m. (after Cartailhac).

In considering the frequency of the holed stone entry in the area the character of the local building material must be borne in mind. Although the device itself was doubtless introduced from elsewhere, the soft sandstone and chalk offered opportunities for its execution which were denied in Brittany and similar areas, in which megalithic architecture was normally executed in hard igneous rocks and shales, so that the frequency of the holed stone in Seine-et-Oise may be at least in some measure a function of the local conditions. Its appearance raises difficult problems because the long gallery or cist with holed stone entries or partitions is widely distributed as a Bronze Age burial form in central Europe and Sweden. But there the furniture is very different and almost certainly later in actual date than that from northeastern France or from the rectangular galleries of Brittany, so that the derivation of the last two from central European forms is practically impossible. The rarity of the type in the major Breton centers suggests, as we shall see, that it was brought in by a distinct movement from the Paris basin. The structural similarity of the Paris galleries to the sunken galleries of Provence and so ultimately to Iberian and Western Mediterranean forms is clear, where the holed stone and its probable

[108] Thirty tombs are listed by Déchelette, Manuel, I, p. 400 and one or two have been reported since, e.g., Pierre Platte de Presles, Seine-et-Oise; cp. Bottet, Rev. Arch., 28, 1928, pp. 1–13 and plate.

prototype, the narrow entrance to the chambers of rock-cut tombs, are also to be found. In discussing this problem Kendrick does not consider southern prototypes on the assumption that the south Iberian tombs are late.[109] But we have argued on quite other grounds that this Iberian "evolutionary series" does not in fact exist and that the holed stone tombs that are cited by him, i.e. Gor and Cueva di Viera, Antequera,[110] are among the first fruits of megalithic architecture. No mention is made, moreover of the fact that the holed stone is a characteristic feature of the tombs of Los Millares,[111] where, moreover, the megalithic, as distinct from the dry walled tombs, consist of bulging oblong chambers separated by a partition from a gallery little narrower than the chamber,[112] i.e., an incipient form of the gallery with vestibule as found in the north. (Figs. 15 and 16.) "Rectangular" partitioned tombs also occur in Algarve, e.g., Nora and Alcala III.[113]

As far as Brittany alone is concerned, the proximate source would appear to be, as is generally agreed, northeastern France. Bosch Gimpera[114] although "tempted to derive (the Paris galleries) from Brittany" yet decides that

> it is, however, more probable that it is in the South, where these types represent the end of an autochthonous development in the Pyrenean culture, that we must seek the point of departure for this type and explain the Breton forms from those of North France and not inversely.[115]

The burials in the Paris galleries were very numerous and interments in successive periods are in some cases, as at Mureaux[116] indicated by the separation of the bones and grave goods by later pavings.

In close geographical proximity to these megalithic galleries, and associated with them in grave goods, are a series of tombs related to the megalithic culture but of very different form. These are the so-called "grottoes" of the Marne, rock-cut tombs excavated in the soft chalk ridges that outcrop in the country immediately to the east of the galleries. In the finer tombs low, vaulted rectangular chambers, from two to nearly four metres square, and one to nearly two metres high, were excavated

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[109] Kendrick, The Axe Age, p. 45.

[110] Kendrick, op. cit., p. 45.

[111] Cf. Siret, L., L'Espagne préhistorique, Rev. Quest. Scientifiques, XXXIV, 1893. pp. 522–523 and fig. 174.

[112] Cf. Los Millares, No. 8, *in* Siret, op. cit. fig. 170.

[113] See Estacio da Veiga, op. cit. 1, Plate XII, p. 248 and 3, Plate XIII, p. 137.

[114] Rev. Anth., 1927, 37, p. 211.

[115] Loc. cit.

[116] Verneau, L'Allée Couverte des Mureaux, L'Anthropologie, 1890, p. 175.

at the end of a descending ramp. The main chamber was frequently preceded by a smaller antechamber. The portals at the entrance and between the chambers are extremely small and repeat the features of the holed stones of the galleries, not only in their size and shape, but also in the recessed panels in which they are set. Resembling the design of Cretan and the Provençal tombs in the open sloping "dromos" which leads up to it, the chamber itself is square in the east Mediterranean and Sardinian style and distinct from the circular types characteristic of southwestern Iberia; but the shallow vaulting of the roof resembles that of Palmella, and here again the crown of the vault was frequently opened from above and covered with a rock slab.

The careful design here described was restricted to a few of the tombs and these contained fewer burials and a richer furniture. The majority were more roughly hewn, irregularly shaped, and crowded with corpses. But their form and grave goods indicate a class distinction rather than any chronological separation from the finer tombs.

The furniture of the galleries and rock-cut tombs of the Paris basin is distinguished from that of the other megalithic areas in the south and west by the frequency of bone tools, points, picks, axe hafts and even axes modeled on stone forms.[117] Polished flint axes are also more abundant in this area than elsewhere in the west. These characteristics are all associated with the special environment of this area. Deprived of abundant sources of hard igneous and metamorphic rock, but richly supplied with flint from the scarps of the Marne, it is not surprising that bone and flint were used extensively. We have also to consider the probability that pre-megalithic folk, using bone extensively and perhaps already, as Åberg[118] claims, in possession of the technique of grinding flint axes, were occupying this area when the tomb builders first penetrated it.

But evidence of the southern source of this occupation is not lacking, the famous "goddess" carvings on the walls of the Marne "grottoes" may be related to anthropomorphic designs on Iberian idols and plaques and to the wall carving in the Dolmen de Soto, Huelva.[119] The statue menhirs of the Cevennes region, although of uncertain date, may serve in some instances, e. g. Collorgues, as an intermediate link. The frequency of tre-

[117] E.g., among the furniture of inhumations beneath slabs at Chateau de Niey. The other furniture was characteristic of the galleries; cp. Bottet, B., Rev. Arch. 28, 1928, p. 14 and figs.

[118] Åberg, N., Studier öfver den yngre Stenåldern i Norden och Västeuropa.

[119] Obermaier, H., El Dolmen de Soto, Bull. Soc. Esp. Excursiones, 32, 1924, pp. 1 ff and figs.

phining on the skulls recovered from the grottoes, also connects the area with southern France, where this operation was most extensively developed.

The callaïs beads and greenstone celts also found in the rock-cut tombs, serve further to integrate this culture with the megalithic culture of the south and west. But it is in the meantime uncertain whether these materials were obtained from Brittany or the south. The former is a very probable source since there is abundant evidence of the introduction of the northeastern type of gallery into the Breton peninsula, while flint from Grand Pressigny in the west is found in both the galleries and the grottoes. A bell beaker sherd from Bennemont, Seine and Oise, may also indicate southern or Breton connections.[120]

Childe[121] regards this northern culture as very late in date and roughly contemporary with the latest period in the Cevennes, basing this opinion largely on the bronze rings and flanged celts occasionally recovered from the galleries and the relative lateness of trephining in the South. But the synchronism with Breton tombs containing bell beakers (see p. 74) precludes so late a dating and the sporadic objects of Bronze Age date can readily be explained by disturbance or secondary burials. The characteristic furniture throughout indicates a relatively early date for the original settlement of the tomb builders and metal is characteristically restricted to occasional beads and blades of copper in the Marne tombs.

Little is known of the megalithic tombs that are scattered through the intervening area between the northeast and the Breton peninsula. The well known tomb at Fontenay le Marmion in Calvados is very different from the northeastern types. Beneath a very large tumulus of blocks of local chalk a dozen passage tombs had been erected in two rows, opening on opposite sides of the mound. The circular chambers were all corbeled and dry stone walling was used throughout except for the roofing of the gallery. The furniture and burials were mostly contained in small megalithic coffers within the chambers.[122] Structurally this monument is most closely related to the Breton corbeled tombs, and the practice of building several passage chambers within a tomb also occurs in Brittany.[123]

The bell beaker is doubtful, and certainly not characteristic in the culture of northeastern France. In southern France, as in Almeria, it is an

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[120] Kendrick, Man, 29, 1929, p. 18.

[121] Dawn, p. 283.

[122] Sausse, Le Tumulus de Fontenay-le-Marmion, Calvados. Rev. Arch., 1, 1897, pp. 163 ff. Déchelette, Manuel I, p. 397 gives a brief account and sketch of the tomb.

[123] e.g., Rondossec, Carnac, three passage dolmens and Rosmeur, S. Finistère, where two passage tombs, one of them corbelled, are covered by the same mound.

occasional but typical ware in the megalithic tombs. In Savoy, beakers are found both in megalithic and cave burials but in its later history it is divorced from megalithic construction, as it was in Murcia and southern Catalonia, and penetrates the continental interior. It may be, as Childe, Siret, and others believe, that the "beaker folk" were already a distinct ethnic element in southern Iberia; it is in any case clear that the ware itself, in its long history in central Europe and in its reappearance in the west in the Bronze Age culture of Britain, was finally and completely separated from the megalithic civilization in which it first appears.

North of the Savoy group the trail is temporarily lost. Bell beakers reappear, but in a new context, in the copper age cultures of the middle Rhine. They are here associated with a hill fort people whose burial furniture characteristically includes copper daggers and archers' wrist guards. In addition to the bell beaker, another strange feature appears in this culture: numerous and large, point-butted polished stone axes, are found in the crouched cist or trench burials. These axes are strangely similar to those of the south Breton tombs. While it is possible that the large point butted celt and the beaker traveled together across France to the Rhineland, we are in the meantime at a loss to explain on this hypothesis the manner in which the two *de luxe* products of the Breton culture should be transferred many hundreds of miles to a people the atmosphere of whose culture is very remote from the megalithic civilization of the west. Despite the point butted celts therefore, it would seem more reasonable to look for contact across the smaller gaps which separate the Savoy area from the middle Rhine. In Savoy, the bell beaker is intrusive in a poor, ill characterized culture. It is more easy to conceive of its being carried into the Rhineland by the same intrusive and less stable people of the south than by the preoccupied builders of Armorica.

Schumacher[124] bridges the gap between the two areas by invoking the "flint camps" of Lorraine and suggests an approach to the Rhine by the Moselle; Åberg and Bosch Gimpera are more disposed to favor movement through Alsace and the Belfort Gap, for which there is now perhaps some slight direct evidence, since Forrer[125] and Schaeffer[126] have claimed beaker influence on certain Alsatian pottery styles found in association with wrist guards and other elements.

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[124] Schumacher, C., Siedelungs und Kulturgeschichte der Rheinlande, Mainz, 1921.

[125] Forrer, R. F., Nouvelles decouvertes *etc.* Cahiers d'archeologie d'Alsace, p. 33, quoted by Poisson, Rev. Anth, 1929, p. 62.

[126] Schaeffer, F.A.S., Les tertres funeraires dans la forêt de Hagenau, Hagenau, 1926, p. 323.

More recently Kraft[127] and Castillo[128] have advocated a more eastern route from the Rhone to the upper Rhine, through the territory of the western lake dwellings. But the beaker was never established in the lake dwellings and it is difficult to believe in a passage however rapid through this region which would leave practically no trace on either the migrants or the occupants.

Schumacher has claimed that the introduction of the bell beaker into central Europe was the work of the Middle Rhine culture picturing an original impulse from the Vosges or the Ardennes as a more or less armed invasion resulting in the occupation of a series of fortified posts extending along the Rhine from Spiers to Köln and spreading out into Hesse Wurtemburg, Thuringia and Saxony. It is difficult in the meantime to decide whether the appearance of Iberian beaker forms further east in Bohemia, Hungary and Silesia marks out the last drives of this eastern movement or is an indication of movement across the Brenner from northern Italy. Castillo claims that[128] the Upper Austrian beakers are definitely closer to the Italian than to the Rhenish and concludes that the Mediterranean beaker folk penetrated deeply into Saxo-Thuringia to encounter their cousins from the Rhineland.

The Megalithic Civilization of Brittany

But the megalithic culture in western Europe was dominantly a maritime civilization and its spread northwestwards along the Atlantic coastlands was far more intensive than the interior expansion so far discussed.

The Breton peninsula projecting westwards to the north of Iberia was the scene of a colonization which rivaled the southern Iberian centres in achievement and density of settlement and affords a valuable commentary on the Iberian culture. Although western Iberia and Brittany were at this period in closer contact than any two areas lying at an equal distance, we do not find complete transplantation of any but the main cultural elements. Traded goods and imitated objects undoubtedly exist and there was undoubtedly extensive migration, but for the most part there is a marked individualization and divergence. The culture of the area will be considered in some detail since, while it is vital to the understanding of the problem, its position is often misrepresented and its essential features are less well known than the Iberian and Danish.

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[127] Kraft, G. K. Die Stellung der Schweiz innerhalb der bronzezeitlichen Kulturgruppen Mitteleuropass. Anzeiger. für. Schw. Altertumskunde, 1927–8.

[128] Castillo, La cultura del vaso campaniforme, Barcelona, 1927.

The general littoral distribution of the megalithic tombs of the Breton peninsula (fig. 25)[129] and the existence of several maritime focal points, leaves us in little doubt not only that the original implantation was effected by sea, but also that maritime traffic was of major importance in the propagation of the culture of the peninsula. The many islands to the south and far west of this coast were occupied without exception and on some, e. g. Groix, megalithic remains are very numerous.

The coastal distribution of the south which links, by littoral extensions and penetrations of the lower reaches of the estuaries, the several major centres of Loire Inférieure, the gulf of Morbihan and southern Finistère, extends on a somewhat diminished scale along the western coasts. Dense

FIG. 25. Distribution of Megalithic monuments in Brittany. Reduced and generalized from a detailed survey; the grading of the stippling indicates the relative density of the distributions.

groups of megalithic remains survive on the Cap Sizun and Crozon peninsulas and the littoral distribution continues through Léon, the northwestern quadrant of Finistère. But in northeastern Brittany coastal settlements dwindle. Apart from one or two clusters behind St. Brieuc and about the estuary of the Rance, megalithic remains are few. The maritime circuit of the peninsula was incomplete and the littoral propagation, so intense in the south and west, faded out in the northeast, where scattered in-

[129] This map generalizes the results of a survey of the distribution of megalithic monuments in Brittany, undertaken in 1925–8.

terior distribution and variant tomb types indicate inland movement from south Brittany and the Paris basin to the east.

Although we know nothing of the vessels used at this period, the conditions of ancient shipping even as late as Roman times force us to realize the great risks and losses involved in open sea journeys along the Atlantic coast. Yet the evidence of distribution and tomb form suggests a direct trans-Biscayan route from Iberia to the Breton peninsula, for megaliths are absent along the shores of southwestern France, while those of the Vendée and southern Loire Infèrieure have not yielded evidence of the magnificence of Southern Morbihan in Brittany and are, moreover, of late and degenerate type.[130] The concentration of Iberian goods and parallels on the south Breton coast indicates direct relations between this area and the southern peninsula.

The most conspicuous concentration of tombs and settlements lies along the southern coasts of the Department of Morbihan from the Étel river to the Gulf of Morbihan, to the south of the towns of Auray and Vannes. This region includes the megalithic remains of the numerous islands of the Gulf, of the peninsulas of Rhuys and Quiberon. Within this comparatively small zone, less than forty km. long and rarely extending more than ten km. from the open sea, several hundred megalithic structures have survived into recent times. All the more important Breton tomb forms occur, together with stone circles, alignments and solitary menhirs in considerable numbers. The South Morbihan region affords, therefore, an almost complete view of the megalithic civilization of Brittany. It appears to have been the earliest and primary, and it was undoubtedly the most important, center of this prehistoric occupation.

The standard and most common form in this region is the passage dolmen with rectangular chamber. The dolmen of Kercado, (fig. 26) one of the best preserved monuments in Brittany, to the northeast of Carnac, is of this form. The tomb is enclosed in a round tumulus of very regular form, 3.5 m. high, 20 m. in diameter, and surmounted by a menhir situated over the center of the interior chamber. A megalithic gallery about 7.5 m. led up to this rectangular chamber, 3 m. × 2.5 m and 2.5 m high. The remains of a stone circle surround the tumulus. This description represents in summary all that was reported by its first modern explorers,[131] but the careful excavations of le Rouzic have disclosed structural features of the greatest

[130] Cp. Pitre de Lisle, Mat., 3, 1886, pp. 285 ff., who notes the marked distinctions between the tombs to the north and south of the Loire estuary.

[131] R. Galles et M. Lefèvre. Dolmen de Kércado en Carnac, B.S.P.M., 1863, pp. 5, 73, 78.

interest.[132] A series of excavations round the base of the tumulus have shown that the mound was not a simple heap of *gal-gal*, or broken rock fragments, but had been faced with ashlar walling about 1.5 m. high. Round the periphery of the tumulus at the base of this wall ran a causeway simi-

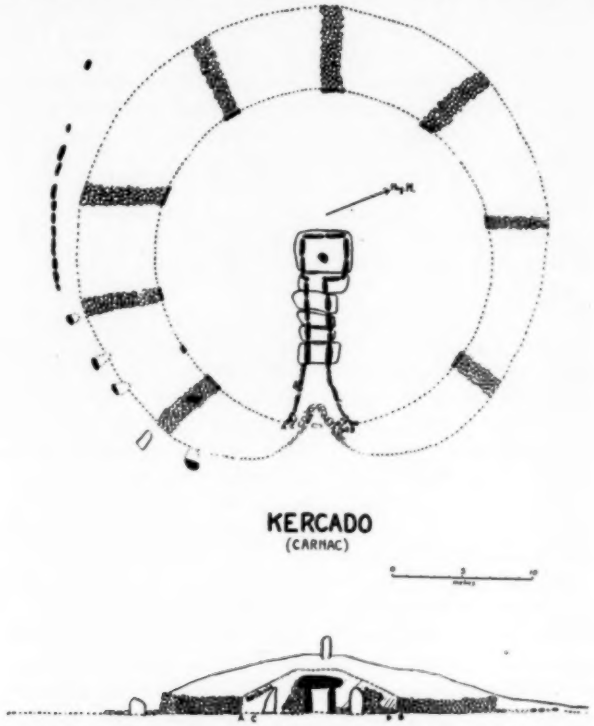

FIG. 26. Passage dolmen of Kercado, S. Morbihan (after le Rouzic). The parts of the encircling pavement exposed in recent excavations are indicated in the plan.

larly constructed of closely packed, uncemented stones. This causeway from 3 to 6 m. wide was further flanked by the stone circle. These stones,

[132] M. Le Rouzic has in preparation a detailed account of the megalithic tombs in Morbihan; plans of the more important tombs have recently been published in his "Corpus des Signes Gravés des Monuments Megalithiques de Morbihan," 1927.

as in the cromlech of St. Pierre, Quiberon, were erected in close juxtaposition, forming a megalithic wall.

The entrance to the tomb was also carefully built. The gallery splayed out towards the entrance, was largely constructed of dry stone walling and merged into the retaining wall of the tumulus. The paved way curved in to follow the line of this vestibule, on either side of which, near its outer extremities, two hearths were found. A menhir in line with the entrance of the tomb had been erected outside the range of the cromlech, which was broken at this point. Le Rouzic's discoveries at Kercado are of the greatest importance. There is no reason to believe that the structure is in any sense unique; the monument was in a fairly good state of preservation and the retaining wall, paved way and hearths had all been concealed by accumulated rubble fallen from the tumulus. A series of concentric retaining walls were discovered by le Rouzic in the tumulus of the corbeled tomb at Ile Longue. He also reports traces of a masonry wall round the ruined Table des Marchands, and a megalithic walling to the tumuli of Manio, Kerlescan and Pendrec in this area.[133] Maximum value may therefore be given to the structural features which this monument has retained. Both the design and the methods employed in building the tumulus are obviously related to those recorded by Siret at Los Millares and elsewhere in Iberia and recur in the chambered cairns of Scotland. The grave goods included bell beakers, carinated bowls, callaïs beads and a small green-stone celt.[134] Passage dolmens essentially similar to Kercado but in varying states of preservation occur commonly in this region, e. g. Keriavel, Petit Mont,[135] Mané Lud,[136] etc. The distinction between the passage and chamber is sometimes less marked, being indicated only by slight angles in the megalithic wall and an enlargement of the inner end of the tomb.[137] The famous and long violated tomb on Gavr'inis, about 15 m. long, with its magnificent but problematic carvings, is of this form. (Fig. 27.)

The polygonal form of passage dolmen is more rarely met with, although a form better known in S. Finistère, with a very short slab-closed gallery and a rounded chamber, occurs at Ploemeur across the Etel (dolmen de St.

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[133] B.S.P.M., 1921, p. 85, and Carnac, Fouilles, p. 117.

[134] Galles, op. cit., Musée Vannes, Musée Miln, Carnac, and verbal information from Z. le Rouzic.

[135] See Le Rouzic, Carnac. Fouilles faites dans la région. B.S.P.M., 1912 (extract).

[136] Galles, L. Etude sur Mane Lud, B.S.P.M., 1864, (Extrait).

[137] In the best preserved of the three dolmens of Mané Kerioned, there is only a slight angle on one side. The chamber itself enlarges towards the interior to double the gallery width; see Le Rouzic, Corpus, fig. on p. 105.

Adrien).[138] The rectangular passage dolmen occurs in more complicated form, in which several chambers of similar size are constructed, each with access to the main chamber of the gallery. The type is well represented at Locqueltas, Locoal-Menden, Er Groh, Erdeven, and Keriavel III, Carnac. The latter yielded bell beaker and other pottery decorated in the combed style and two callaïs beads.[139]

The famous tomb of Mané Rutual, Locmariaquer, has a double chamber. The smaller first chamber is rectangular and behind it lies a larger polygonal chamber covered by an enormous (now broken) capstone.[140] (Fig. 27).

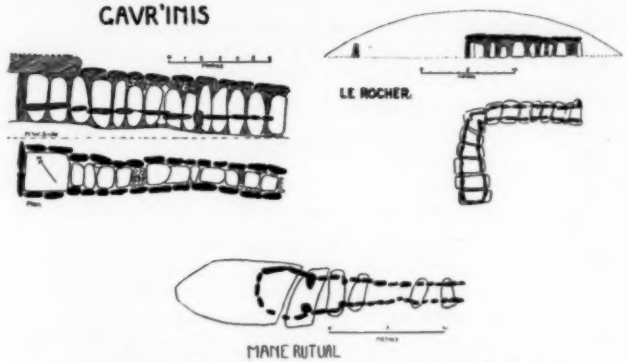

FIG. 27. Tomb types in S. Morbihan. (after le Rouzic)

The close kinship between the Breton passage-dolmen and the Iberian tomb of similar form is obvious and has long been recognized. In Brittany the chamber is more frequently rectangular and the development of multiple chambers of equal size is special, but the type as a whole is essentially the same. As in Iberia, dry walling is used to fill in gaps in the megalithic walling. The Gavr'inis type, in which the chamber is but little broader than the gallery, occurs also in Spain. The dolmen de Soto, Huelva, for example, although a little larger, is constructed in precisely the same manner with a chamber and gallery of similar proportions. Double chambers built one behind the other occur in Iberia, e. g. the Cueva de Romeral,

[138] Le Rouzic, Carnac, Fouilles, 1921, p. 19 and fig. on p. 26.

[139] B.S.P.M., 1886, p. 95.

[140] B.S.P.M., 1860 and 1885; Catalogue du musée de la Societé Polymathique, Vannes, p. 25.

Antequera, Andalucia, where, however, the chambers are circular, vaulted and separated by a short corridor.

The straight covered gallery *allée couverte* is not frequent in southern Morbihan. It is, however, very important elsewhere and, while the distribution suggests important and special lines of movement, it is possible to show that it is an integral part of the megalithic culture and virtually contemporaneous with the passage dolmens. The *allée couverte* du Net, St. Gildas de Rhuys,[141] in the S. Morbihan area, contained bell beakers and typical "megalithic" grave goods. The most interesting features of the Kerlescant tomb near Carnac are the two "holed stone" entries, one in a lateral wall in the shorter of the two compartments, and the other in the megalithic wall separating the two. Both these entries had been formed by carving away a semicircular hole on the sides of two adjacent slabs. Lukis reported a similar entry in one side wall in another gallery about 24 m. long at Kertearac, quite close to Kerlescant; this monument has since been entirely destroyed. The passage dolmen of Garen-Dol, Kerlouan, Morbihan, and the laterally chambered Parc-ar dolmen, St. Pol de Léon, N. Finistère, also had holed entries constructed in a similar manner.[143]

Evidence from both tomb and grave goods indicates the close relation between the Breton galleries and those of northeastern France[144] and the same form extends into the Channel Islands where the "long cist" of Le Couperon, Jersey, shows detailed structural similarity with the Kerlescant tomb.[145] The tombs of N. Brittany indicate still more strongly the closeness of this connection. In northern Ille-et-Vilaine, the Côtes-du-Nord, the rectangular *allée couverte* is the standard tomb form. The magnificent tomb of Esse, three kilometres from Rétiers, reproduces all the characteristic features of the galleries of the Paris basin, while Tresée (Maison des Feins) further north, has another resemblance to the Seine tombs, since it is buried in the ground and shows no trace of a covering tumulus.[146]

[141] Le Rouzic, Z. Carnac, Fouilles, 1921, p. 8.

[142] Lukis, Journ. Brit. Arch. Ass. 24, 1868, p. 40 ff.; see also Salmon, P., Dolmen avec Tumulus et Cromlech à Kerlescan, Commune de Carnac, Paris, 1887. The monument had been opened and explored in 1851 when the megalithic roofing slabs were nearly all removed; the objects then recovered are not recorded. The investigations of Lukis disclosed the furniture still preserved. A Bronze Age single-handed pot, also recovered at this time, is preserved in Vannes Museum.

[143] Salmon, P. op. cit., p. 6.

[144] Forde, C. D., The Megalithic Gallery in Brittany, Man, 29, 1929, 80, contains a detailed account of the material summarized here.

[145] Cf. Kendrick, The Axe Age, 1925, p. 23 ff.

[146] Bézier, op. cit., p. 148, Pl. 13 and cf. Danjou, Bull. Soc. Arch. Ille-et-Vilaine, 1880 (extract). A gallery at La Turballe, Guèrande, Loire Infèrieure, is also partly excavated in a natural mound. Cf. Bull. Soc. Arch., Nantes, 22, 1883, pp. 115–116.

Megalithic galleries of the same type are frequent further west in the Côtes du Nord.[147] The gallery of Tertre de l'Eglise in this area contained inhumations, some forty polished stone celts, beads and a metal (copper?) "dagger." Tombs of the same type occur at La Poterie,[148] and on Ile Grande,[149] and further east.[150]

The same tomb form extends into N. Finistère, where a small but spacious example 8.5 m. long occurs at St. Pol de Léon.[151] The gallery of Mougan Bihan near Commana, Sizun, was 13 m. long. The gallery of Kerbannalec near Beuzec-Cap-Sizun, in the southwest, resembled the Kerlescant tomb in that a row of megalithic slabs had been erected parallel to the chamber along one side. Its contents relate it definitely to the southern culture, for a carinated bowl with groups of vertical incisions was found, with flint points and a spindle whorl, but the closed gallery is rare in southern Finistère and the form of this tomb undoubtedly suggests relations to the northern types. (Fig. 28.)

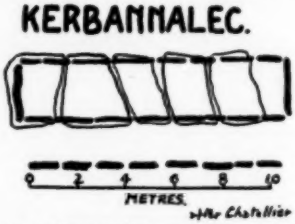

FIG. 28. Gallery of Kerbannalec, S. Finistère.

It is therefore clear that the covered gallery implies a distinct tradition in the megalithic architecture of Brittany and indicates an extensive movement from the Paris basin to the east.

There also appears in Brittany a tomb form which is extremely rare elsewhere. This is the angled gallery (*allée coudée*) of which Le Rocher, Plougou-

[147] Fornier. Mem. Soc. d'Emulation, Côtes du Nord, 1872, p. 1; Harmois, A-L., Inventaire des découvertes archéologiques du département des Côtes-du-Nord. Mem. Soc. d'Emulation, Côtes-du-Nord, 47, 1909, pp. 5–6.

[148] Harmois, A.-L., La Potérie, Lamballe, Mem. Soc. d'Emulation, 44, 1911, p. 1 and cf. Mat., 1884, p. 478.

[149] Harmois, Inventaire, 1912, p. 219.

[150] De la Chénelière, G. Inventaire des monuments megalithiques compris dans le département des Côtes-du-Nord (subsequently cited as Inventaire), Mem. Soc. d'Em., 17, 1880, pp. 129–130, 107–8; Mem. Soc. Arch. Côtes-du-Nord, 1845, p. 16 ff.

[151] Du Chatellier, Ep. Préh., p. 101 and cf. Mougan Bihan, Sizun, Mat. 1884, pp. 553–555 and figs. 257–8.

melen, in southern Morbihan, is a fine example. The gallery consists of two sections at right angles, the one leading into the other. The walls of the upper gallery are not parallel but splay out at the upper end, suggesting a definite chamber. (Fig. 27.)

The gallery of Pierres Plates, whose walls are decorated with a group of very important carvings, is also angled. The inner gallery was closed to form a separate chamber and a lateral chamber was built out at the bend. In S. Finistère, the right-angled gallery of Poulguen has parallel walls and a division into compartments, suggesting analogy with the Kerlescant type.[152] Many of the uprights in both galleries show carvings resembling those of Morbihan, but of a less elaborate character.[153]

The carvings on Le Rocher, Pierres Plates, Luffang, (another angled gallery considerably ruined) are all of one type, the "octopus" (?) design. A somewhat similar design occurs at Lizo in a tomb probably of the same form,[154] while one of the designs carved at Poulguen,[155] is of related character. The association of this design with the angled gallery may indicate the restriction of a certain motif to a special tomb type and also possibly represents a chronological distinction. On this assumption, the absence of the angled gallery in Iberia suggests its development further north at a period later than the first megalithic occupation of Brittany. It must however be realized that in technique and appearance these designs are closely related to the "buckler" designs of Ile Longue, Mané-er-Hroëk, etc. and one or two of the carvings at Pierres Plates are of the "buckler" type[156] while the furniture of le Rocher and Lizo is not to be distinguished from that of the megalithic tombs in general, so that the difference in time, if any, is small.

Massive closed chambers are also found in the S. Morbihan region. That at Tumiac should perhaps be regarded as a shortened gallery and it is largely built of dry stone walling,[157] but the "dolmen" in the west end of Moustoir tumulus of the same form, was entirely megalithic.[158] (Fig. 29.)

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[152] Martin, A. Nouvelles explorations du Tumulus de Poulguen. Bull. Soc. Arch. du Finistère, 29, 2, 1902, p. 23. For a description of this tomb and a report of the various explorations see Forde, C. D., Ant. Journ., 1927, p. 7.

[153] Chambered variants of this type are known, as e.g., Run Aour, S. Finistère, and Kergonfalz, Bignan, central Morbiham.

[154] See La Rouzic, Z. Corpus des Signes Gravés, p. 29 and appropriate plates.

[155] Forde, C. D. Ant. Jour., VII, 1927, p. 19, fig. 5.

[156] Le Rouzic, Z. Corpus, Plates 90 and 94.

[157] Galles, R. B.S.P.M., 1862, p. 1.

[158] B. S. P. M., 1864, p. 117.

Distinct from these are the closed chambers of Mané-er-Hroëk.[159] and St. Michel. The famous tumulus at Mané-er-Hroëk was originally a hundred metres long. There is no gallery and the megalithic blocks, although of great size, were not orthostatic but disposed horizontally to form a chamber of cyclopean walling 3.9 m. long by 2.8 m. wide and 1.50 m. high, supporting megalithic capstones (fig. 30). On one side of the chamber a carved upright had been erected. The furniture included ten large greenstone axes and nearly a hundred small celts of fibrolite. Callaïs beads were found with the axes but no pottery is recorded. The mode of burial is very doubtful. It is generally assumed to have been inhumation on the meagre data of Galles' report.

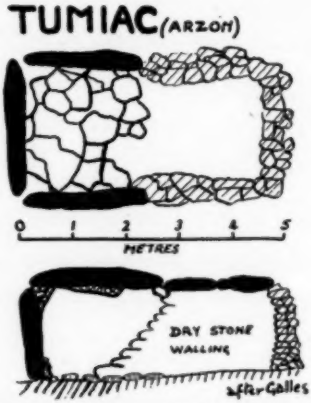

FIG. 29. Closed chamber in the Tumulus of Tumiac, Arzon, S. Morbihan.

The central chamber at Mont St. Michel, which was surrounded by a large number of small cists, is very similar to Mané-er-Hroëk but of slightly smaller dimensions.[160] This tomb also contained magnificant greenstone axes. Bosch Gimpera[161] reports a poor and perhaps doubtful beaker. The wealth of axe furniture and lack of pottery associated with exceptional forms of chamber in huge tumuli have led to the suggestion that these tombs

[159] This tumulus was very summarily excavated by R. Galles in 1862; see brief report in B. S. P. M., 1863, p. 18, cf. also Catalogue, Vannes, 1921, p. 21.

[160] Galles, R. Rapport à M. le Prefet du Morbihan sur les Fouilles du Mont St. Michel *and* B. S. P. M., 1862, p. 7. This tomb has since been investigated by the Societé Polymathique and M. le Rouzic.

[161] Bosch Gimpera, Rev. Anth., 1926, XXXVI, p. 335, Reallexikon, 4, 38.

are chronologically distinct from the other megalithic chambers. Le Rouzic, Childe,[162] and Bosch Gimpera[163] consider them later than the other tombs, while Åberg[164] suggests that they are earlier since they contain no bell beakers. These conclusions appear to be very uncertain. It must, in the first place, be realized that only a very small minority of the megalithic tombs have been preserved intact for modern exploration, and Tumiac, Mané-er-Hroëk and St. Michel have probably retained their funiture in virtue of their closed chambers buried in large tumuli with no entrance gallery. Greenstone axes, as such, although so abundant and finely worked, do not constitute a chronological distinction and it is argued elsewhere that the bell beaker is associated with the megalithic culture in Brittany from the beginning. It must also be remembered that Tumiac, although a closed tomb, does not closely resemble Mané-er-Hroëk or St. Michel. At

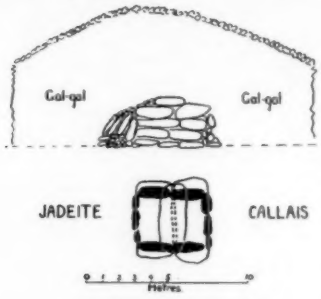

FIG. 30. Closed chamber in the Tumulus of Mané-er-Hroëk, Locmariaquer, S. Morbihan. (after le Rouzic)

Tumiac the tumulus was roughly circular "(conoid)" and not elongated. Orthostatic slabs and ashlar walling were employed. In it, moreover, carvings of the Gav'rinis type occur on the supports and burial was by inhumation, while at St. Michel incinerated remains were found. The elongated triangular form of the ceremonial axes, although rare elsewhere, is frequently represented in carvings on the pillars of many tombs of more normal type, e. g. Gavr'inis, Mané-Lud etc.[165] The main shield-like carv-

[162] Dawn, p. 281.
[163] Rev. Anth., 1927, p. 209; Reallexikon, 4, 44.
[164] Civilisation énéolithique ibérique, p. 174.
[165] Le Rouzic. Corpus Des Signes Gravés . . . . , Paris, 1927, p. 42 ff. and pl. 108.

ing on the Mané-er-Hroëk pillar is of the family of designs from Ile Longue (corbeled passage tomb), Mané Kérioned and Grah Niol (passage dolmens) etc.[166] In these three tombs, moreover, large numbers of small fibrolite and other axes of the trapezoidal type accompanied the ceremonial axes, so that we remain doubtful whether these tombs were early or late in the megalithic phase. The greenstone axes and calläis beads, the carvings of Tumiac and Mané-er-Hroëk, and the instability of burial practice suggest rather that they are an integral part of it and can have been little earlier or later than the passage dolmens.

A well-preserved corbeled "beehive" tomb—the tumulus of Ile Longue —is found on one of the islands of the Gulf. In an elaborately constructed circular tumulus with three concentric retaining walls, is a rectangular chamber with rounded corners, approached by a gallery of megalithic blocks and ashlar walling. The lower part presents very Iberian features in the megalithic walling of the lower part of the chamber.[167]. Its corbeled roof was originally nearly five metres high. The tomb was explored in early times and no furniture has been preserved. But apart from the structural features of retaining wall and splayed entrance recalling the conditions discovered later by Le Rouzic at Kercado, its erection in the megalithic period is confirmed by the numerous carvings discovered in the restoration of the monument in 1907.[168] The main carvings are of the "buckler" type and show clear parallels to the design on the Mané Rutual passage dolmen capstone, the Table des Marchands headstone, the Mané-er-Hroëk pillar and above all to the megalithic block found close by the ravaged tumulus of Moustoir.[169] The ruins of other corbeled chambers are found in S. Morbihan e. g. St. Germain, Erdeven.

At Rosmeur,[170] near Penmarc'h in S. Finistère, a corbeled passage tomb was found, together with a covered gallery in a single circular tumulus. The furniture of the gallery, which was better preserved, did not indicate a particularly late date for the monument.

Small roughly-made coffers of heaped stones were also used at the same time as megalithic tombs. The graves in the "tertre du Manio" Carnac, built previous to the surmounting alignments of Kermario were of this

[166] Le Rouzic, op. cit., p. 31 cf. Pl. 24 with Pl. 26, 33, 65 etc.

[167] Cf. the dolmen de la Granja, Badajos. See Obermaier, H., El Dolmen de Matarrubilla, p. 36 and pl. 2, and Los Millares see Siret, L., L'Espagne préhistorique, p. 522.

[168] Le Rouzic, B. S. P. M., 1916; Corpus, p. 182 ff., Pl. 60–66 and casts in Musée Miln, Carnac.

[169] Corpus, pls. 39, 56 and 138.

[170] Du Chatellier, P., Les deux tumulus de Rosmeur, Point de Penmarc'h, (Finistère). Mat., 10, 1879, p. 145.

type.[171] The monument consisted of a low, roughly-rectangular, dry-walled mound. The central stone-walled, slab-covered chamber was flanked by a menhir, at the foot of which four polished stone axes were discovered. This chamber was surrounded by a large number of minute square coffers, whose interior measurement was little more than a quarter of a metre each way. These were found throughout the length of the mound. Each was constructed with small blocks of stone and surrounded by other small slabs leaned against the walls. In one, pottery was found in sufficient quantity to determine the close relationship of these tombs to the megalithic culture.[172] Similar coffers surround the central "dolmen" of Mont St. Michel and occur in the mounds of Castellic and Crucuny.[173] The indiscriminate passage of the alignment of Kermario, a part of the great system of Carnac alignments, across the low almost imperceptible mound of Manio, undoubtedly indicates that the former were built later than the tombs and probably after they had been forgotten. Although they are difficult to date, we cannot claim that the alignments are later than the megalithic culture as a whole, so that the coffers themselves are relatively early. (Fig. 31.)

FIG. 31. Small coffers in the Tertre du Manio, Carnac, S. Morbihan (after le Rouzic.)

It appears probable that even in Brittany, despite the general hardness of its rocks, rock-cut tombs were occasionally hewn in the softer outcrops as burial places by the megalithic people. Du Chatellier describes "souterrains" in Finistère which may have belonged to the megalithic civilization.[174] At Pont Croix, a circular vaulted chamber 2 m. in diameter and 1.6 m. high was approached by a narrow descending cutting 50 cm. wide and 3 m. long. The furniture—black earth, charcoal and pottery fragments—suggest a "megalithic" burial but no details are given. A tomb of somewhat similar form is reported to the southeast in Loire Infèrieure, at Roche Trocante, near Arthon. Here there is a subterranean gallery ending in a chamber described as "rounded after the manner of a vault, regularly hewn in the cal-

[171] Le Rouzic, Z., Carnac, Fouilles, Campagne 1922, p. 47 ff.

[172] Ibid., p. 118, cf. B.S.P.M., 1921, p. 87.

[173] Le Rouzic, Z., Fouilles, 1922, Carnac, Tertre du Castellic, Pl. IX, p. 137: Tumulus du Crucuny, Pl. 1 and p. 5 ff.

[174] Grottes sepulcrales artificielles dans le Finistere, Mat. I, 1884, p. 75 ff.

carious rock." The entrance is very small but the gallery 7.8 m. long and 2.1 m. wide enlarges to a height of 1.9 m.[175] These descriptions although inadequate, indicate a form related to the "grottoes" of the Marne. Unfortunately no furniture is recorded. Other "souterrains" of different form probably belong to the Iron Age e. g. La Tourelle.[176]

Du Chatellier also reports two natural caves used as a burial place in megalithic times at Guesseny and Kerouan, Finistère. Both contained cinders, polished stone axes, human and animal bones. In the second, cinerary urns "of various periods" were found.[177]

In Finistère and elsewhere there occur, together with tombs of more normal types, forms which show considerable variation from those so far discussed.[178] They are groups of large chambers flanking a central "dolmen." These grouped chambers were generally erected in sets of two, three or four, the whole system being covered by a long, low tumulus. In some cases, e. g. at Pen-ar-Menez, the central covered chamber might better be called a gallery, although it is quite short. It does not, however, afford access to the flanking chambers in the manner of the multiple-chambered dolmens of Morbihan. The flanking chambers are larger than the central "dolmen", of rectangular form about 2 m. along each side and built in megalithic blocks of varying height. They show no sign of having been covered by megalithic capstones. Sometimes, however, as for example in the group east-north-east of Kervignon and again at Kervastel, a quantity of large stones were found among the upper layers of the earth that filled the chambers. It appears that these chambers were generally protected by heaping rough stone blocks on the top after they had been filled with earth. It is also possible that they were sometimes roofed with wood, which has since disappeared. Between Tronwal and Kervantic are the ruins of a group of four "dolmens" flanked by numerous chambers. At Kervignon a further group was explored by du Chatellier; as elsewhere the large flanking chambers were not covered by megalithic capstones.[179]

Grouped chambers of this type are not confined to the south and occur frequently further north, e.g. the complex tomb of open chambers at Lanildut, Guiligny, N. Finistère.[180] Marsille[181] reports similar uncapped

[175] Pitre de Lisle. Dictionaire archéologique, B.S. Arch., Nantes, 1885, V., P. 2.

[176] Cf. du Chatellier, op. cit.

[177] Ep. Préh. pp. 15, 16.

[178] A more detailed account of the megalithic monuments of Southern Finistère is given in Ant. Jour., 1927, 7, pp. 1 ff.

[179] Mat., 1881, p. 267.

[180] Du Chatellier, Ep. Préh., p. 148.

[181] B.S.P.M., 1924, pp. 8–9.

and grouped chambers in central Morbihan at St. Marcel and Serent, while the chambers of Grand Carreau Vert, Loire Inférieure, were grouped together as in S. Finistère.[182]. The megaliths to the south of the Loire in this *département* and in the Vendée contrast with those further north in the complicated plans of their chambers, but data are not adequate to attempt to establish precise parallels with Finistère.[183]

Slab cists containing burials and furniture similar to that of the megalithic monuments are numerous in the west. They are found singly and in groups. Some are below tumuli and others are buried in the ground with no surface indication of their presence. Both inhumations and cremated burials are reported from these cists and from simple trench graves. The grave goods, although generally poor, are not distinct from those of the larger megalithic tombs and are certainly not related to the later Bronze Age culture of the peninsula.[184]

In Finistère as in Morbihan we have clear evidence that the megalithic chamber was not the only means of disposal of the dead. As in Iberia, trench graves, cave burials and slab-lined cists were all used. Many factors, such as locality, wealth and labor, undoubtedly affected burial practice in different areas and at different times. Although we are justified in speaking of a "megalithic culture" it must nevertheless be recognized that the megalithic tomb was not invariably used.

I have shown elsewhere that in relation to the great centre of southern Morbihan, S. Finistère manifests the conditions of a marginal area of lower culture in which there was nevertheless a great density of settlement. The traditions and techniques of megalithic architecture were less firmly rooted and crude but novel tomb forms were developed. This would appear to be equally true of the country south of the Loire in the east and also apart from influence from northeastern France, of north Brittany as a whole.

Dominant Iberian influence is again indicated in the tools and ornaments recovered from Breton tombs and settlements. As in Iberia, handles are not found on the pottery of this period, but flat and pierced lugs, vertical and horizontal, are extensively used. Two pottery forms are of the greatest significance, the bell beaker and the carinated bowl.

Beakers of varied proportions, workmanship and ornament, although less numerous than the rougher spheroid pots, are characteristic of the entire range of tombs. They are inextricably mixed with other wares and cannot

[182] Pitre de Lisle, Mat. 3, 1886, pp. 279 ff. and figs. 103–4.

[183] Ibid., p. 285.

[184] See Forde, C. D., Ant. Journ., 7, pp. 28 ff. for an inventory and analysis of these burial types.

be assigned to one tomb-type or period. The finest are essentially "Iberian" and of fully developed form. On the whole, however, the ornament is less elaborate and the restraint suggests that it was introduced into Brittany at a date relatively late in its history in Iberia. But as we are unable to correlate it in Brittany with any one type of tomb or a specific region, we cannot decide its chronological position here. The negative evidence of the Mané-er-Hroëk tomb-type is quite ambiguous, and since it is found so abundantly in the passage dolmens of the Carnac-Locmariaquer region it would seem most probable that it accompanied the first settlement. (Fig. 32.)

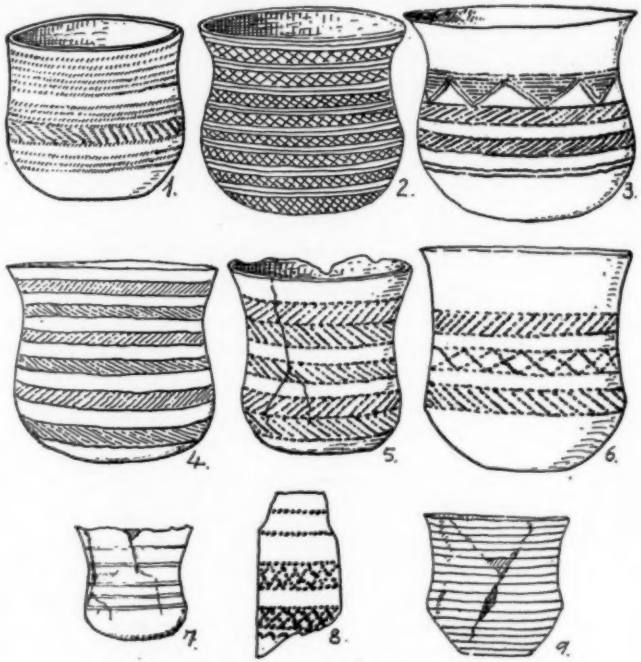

FIG. 32. Bell beakers, Morbihan, Brittany. (after Castillo.)

The carinated bowls are also found in tombs of various types (fig. 33). They are generally undecorated except for groups of vertical plastic ribs on the upper wall, e.g. Renongard and Kerugou, Finistère, etc. A similar

design is produced by the incision of groups of vertical lines on the upper wall e.g. the bowl, 16 cms. wide and 10 cms. deep from the *allée couverte* of Kerbannelec, Beuzec Cap Sizun, Finistère, has three groups of six vertical incisions.[185] Others are taller with less pronounced carination e.g. Lesconil, Finistère. The carinated bowl occurs widely in Iberia. It is associated especially with the "megalithic" tombs and passage dolmens of the south and west. In the Portuguese passage dolmens, as in Brittany, plastic ribs are sometimes used to decorate the concave upper part of the bowl.[186] Their presence reinforces the evidence of the beakers that there was direct traffic by sea between S. Iberia and the Breton peninsula.

The "combed" and incised ornament on beakers and other pottery includes obliquely hachured bands, zigzags, incised and reserved, and other patterns known from S. Iberia. But the more elaborate designs of the Palmellan and Andalucian wares do not occur.

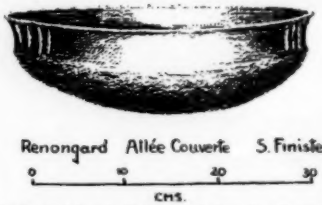

FIG. 33. Carinated bowl, Brittany (after du Chatellier). Note the plastic ornament of vertical ribs.

But the pottery of the Breton culture was not entirely derived from Iberian forms, and the abundance of plastic ornament, curvilinear bands, knobs and lugs, suggests that early continental fabrics penetrated this area. Déchelette[187] has shown the relation in both form and ornament between such Breton wares and that of the "Camp de Chassey" and other stations in eastern France. More specifically the small flat-bottomed goblets characteristic of the Paris region recur occasionally in Brittany, e. g. La Roche, Dongues, Loire Inférieure, while rough imitations of Baltic dolmen forms ('collared flasks') are also known (Lann-Blaën, Guidel, Morbihan and Kerandrèze, Moëlan, Finistère).

It has already been shown that callaïs, the green bead material, was used abundantly in Brittany. With the exception of a single bead from a tumulus

[185] Du Chatellier, P., Mem. Soc. d'Em. Côtes du Nord, 17, 1880, p. 199 and Pl. 10.

[186] Leeds, E. T., op. cit., p. 220.

[187] Manuel, I, p. 539; see Reallexikon, 4, pp. 36–7, for a brief analysis of the wares associated with the Breton culture.

in Loire Infèrieure (Motte Ste. Marie) it is confined to southern Morbihan. In all, over five hundred beads and pendants have been recorded and preserved. Among the prehistoric collections at Vannes there are no less than 405 beads and pendants from the great tombs of Tumiac (249), St. Michel (107) and Mané-er-Hroëk (49). There is also a rich collection in the Musée Miln at Carnac from the tombs of St. Michel (29) Mané Lud (26) and Kercado (203).[188]

Although well known from many prehistoric sites in western Europe, callaïs is nowhere, outside Portugal, as abundant as in southern Morbihan. About 130 beads are recorded in Provence a few from southeastern Spain, from the tombs of the French Pyrenees, the Massif Central (Lozère and Aveyron) and the Marne.[189] The Breton specimens are as fine as any in color and size. Some of the pendants are over 4 cms. long. The beads are small and discoidal in shape with irregular facets; larger olive-shaped beads are more rare. The bead from Motte Ste. Marie, Loire Infèrieure, was more carefully shaped than is usual in Brittany. Those of Provence are smaller still and more often cylindrical. The Portuguese beads show a much wider range of size and form. They are olive-shaped, globular, discoid and cylindrical. Cartailhac pointed out that the beads of Morbihan are very rough in comparison with the finest Portuguese specimens. He placed the Provençal halfway between in quality of workmanship.[190]

Callaïs is chemically close to turquoise and the two substances may occur together. But although its character is well known, no west European source for the material has been reported. Brittany is itself an area geologically favorable to its occurrence.[191] But while the existence of large quantities of roughly worked material might favor a Breton source for the callaïs which was then trafficked back to Iberia and more elaborately worked there, the views that it was carried with the bell beaker into Brittany, or again was discovered a second time, locally by Iberians in Brittany, remain equally possible. In any case the distribution of worked callaïs is of great significance and indicates the extent to which a single ornamental material was adopted through western Europe at this period (cf. map, fig. 4).

[188] To the 56 beads already recorded from this tomb are added a further 147, recently discovered by M. le Rouzic.

[189] See Marsille, op. cit., B.S.P.M., 1924 and Cazalis de Foudouce, De l'emploie de callais dans l'Europe occidentale aux temps préhistoriques. Congrès International d'anthropologie à Lisbonne, 1880, pp. 314 ff.

[190] Cartailhac, Les Ages Préhistoriques de l'Espagne et du Portugal, p. 131.

[191] Cf. Lacroix, Mineralogie de la France, IV, p. 486 and de Limur, Bull. Soc. d'Em., Cotes du Nord, 1874, p. 94.

Le Rouzic has recently recovered a segmented blue paste bead from a passage dolmen at Parc-er-Guren, Carnac.[192] This bead, which was found in the earth on the floor of this long ravaged tomb, is of a well known late Middle Minoan type. Similar beads have been recovered in England, but they are found in round barrows of the second period of the Bronze Age, while in Iberia, the most probable source of the Breton specimen, this type has been found only in a late grave of the El Argar culture (tomb of Fuente Alamo) where segmented beads in bone and "glass" were found in association with pedestaled bowls and a bronze sword.[193] The discovery of a fragment of a riveted copper (?) dagger indicates that the Carnac bead probably relates to a secondary burial of later date than the fragments of "dolmenic" and bell beaker pottery that were also sifted from the floor.

In southern Morbihan considerable numbers of large point butted greenstone celts have been found. Like callaïs these are especially associated with the three large closed chambers of this area, but similar forms have been found elsewhere in Brittany in passage dolmens, galleries and hoards.[194] The workmanship is extraordinarily fine and some forms show beveled sides with median ridges and splayed blades characteristic of metal forms. The materials used were jadeite, chloromelanite, various pyroxenite rocks (augites), and occasionally diorite. These are undoubtedly local, for although outcrops of every variety have not been found, the metamorphosed pyroxenites and amphibolites of southeastern Brittany are an obvious source for such materials and extend over the precise area from which the axes have been found.[195] (Fig. 34.)

But these axes also suggest Iberian connections, for large specimens of very similar form have been reported from Algarve in southern Portugal[196] and Siret[197] records an extensive use of greenstone for axe material at El Garcel and Los Millares in the southeast.

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[192] Cf. Man, 36, 1929, p. 69.

[193] Siret, L. Las Primeras Edades, pl. 68., Cf. Åberg, op. cit., p. 163.

[194] In a monograph now being prepared for publication a detailed enquiry into the character, distribution, and sources of these axes will be given.

[195] Cp. Damour, Comptes Rendues de l'Academie des Sciencies, 61, 1865, pp. 313 ff., pp. 359 ff., 63, 1866, pp. 1038; Lacroix, Mineralogie de la France, I, p. 615. Barrois, Les pyroxenites du Morbihan, Ann. Soc. Geol. du Nord, 1887.

[196] Estacio de Veiga, Antiguidades, 2, p. 369 and Pl. 16; of Cartailhac, Les Ages Préhistoriques, p. 194 ff. Da Veiga found forty-three, mostly of diorite in two circular (?corbeled) chambers at Aljezur with schist plaques and large flint blades. Cartailhac figures very fine specimens of unknown source in local collections.

[197] L'Espagne préhistorique, R.Q.S., 1893, pp. 489 ff.

But other elements of the stone grave goods derive from eastern and northern types. Flint axes of forms related to those of the Paris basin are occasionally found in the Breton tombs. Perforated axes of a variety of types are known. Bored hammer axes rounded at one end of the type found in the chamber at Petit Mont, Morbihan,[198] have frequently been reported in Loire Inférieure,[199] while symmetrical double bladed axes occur in Morbihan and Finistère.[200] Both these types are well known Baltic forms characteristic of the passage tombs and later separate graves.[201]

The curious knobbed axes, unbored diorite celts terminating in a rounded knob, which occur as stray finds in Morbihan and Vendée may also be related to the polygonal battle axes of the Danish dolmens.[202]

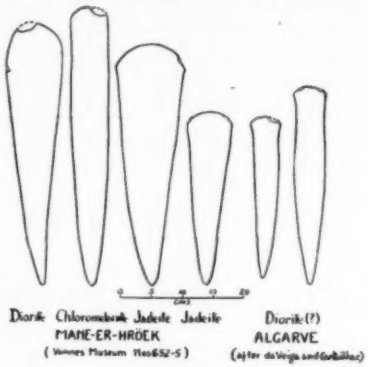

FIG. 34. Ceremonial greenstone axes.

Spheroid[203] and discoid[204] maceheads are occasionally found in Breton dolmens, but the former, although not Iberian, are probably of southern origin and can be paralleled in Sicily and the early Sardinian culture.

The megalithic culture of Brittany has been frequently regarded as truly "neolithic" in the sense that the use of metals was quite unknown.

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[198] B.S.P.M. 1912, p. 118. Vannes Museum, No. 592.

[199] B. S. Arch. Nantes, 64, p. 28 and fig. and 61, p. 33 and fig.

[200] Forde, C. D., Ant. Journ., 7, 1927, p 12.

[201] Cp. Montelius, La Suède préhistorique, p. 12 and fig. 5. from Bohuslan; idem, Antiquités suèdoises, figs. 33 and 34.

[202] Marsille, L. Catalogue, Vannes, p. 40. Cp. Åberg, Studier, 1912, p. 24.

[203] E.g., Souc'h, Finistère.

[204] E.g., Moustoir, Morbihan, of marble (?). B.S.P.M., 1864, p. 117 and Vannes Museum, no. 586.

Although Déchelette[205] rightly pointed out that such absence of metal indicated a process of impoverishment with northward migration, the view that this region was an early and "primitive" megalithic area has but slowly been discredited. In the scattered reports of the exploration of tombs in this area the use of gold and copper by the megalith builders is abundantly proven.

Bracelets and armlets of thin sheet gold are reported in southern Morbihan. Two were found in a pot containing cinders and charcoal in one of the three parallel galleries of Rondossec, near Carnac. They are of thin sheet gold, closed by interlocking the thin ends and ornamented by transverse stencil-like cuts in the broader part.[206] A "diadem" of thin sheet gold ornamented in a similar manner with horizontal slits is reported from a late cist burial in Algarve in association with "Palmella" copper points.[207] Two smaller bracelets formed of narrow bands of thin gold similarly closed by hooking together the tapered ends were recovered from the ruined dolmen of Belz, Morbihan, in 1862.[208]

Five small gold strips, the largest 8 cms. long and 2 cms. wide, pierced at each end with six small holes, were found by Le Rouzic in his exploration beneath the floor at Mané Lud.[209] These fragments appear to have been used to decorate the hilts of instruments or weapons.

From the tomb of Kerallant II, St. Jean Brevelay, in central Morbihan, a tubular gold bead 1.3 cms. long, formed by rolling a thin sheet and decorated by three incised lines on the edge, was recovered together with a "bracer" and several beakers.[210] Nine similar tubular gold beads, the first 1.8 cms. long, were found by Pitre de Lisle in the chamber of Motte Ste. Marie, Loire Inférieure. These are related to the tubular gold beads of Castellet (Provence) and Halliade. The tomb was a divided gallery, 5 m. long, with incinerated remains. The other furniture included a very finely shaped callaïs bead and a bell beaker also of very superior quality.[211]

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[205] Manuel, d'Archeologie Paèhistorique 1.

[206] Mat., 1865, 2, p. 494; 1867, 3, p. 25; Trésors de l'Armorique occidentale, Soc. d'Em. Côtes-du-Nord, Plate 10, Nos. 1 and 2; Histoire naturelle du Morbihan, p. 210, and facsimile in Vannes Museum, No. 1257.

[207] Santo Bento de Balagues, da Veiga, op. cit., 4, Plate 4.

[208] Trésors, 10, 3, and 4.

[209] B.S.P.M., 1912, Fouilles, p. 6. A large hollow and spherical gold "bead," 3.2 cms. in diameter, decorated in *repoussée* was recovered from Er Roh, la Trinité. This is, however, almost certainly of later date and Roman objects (coins etc.) were also found.

[210] Vannes Museum, no. 39.

[211] Pitre de Lisle, Notice sur les fouilles du tumulus de Motte Ste. Marie, Loire Inférieure. Bull. Arch., 1891, pp. 36 ff. The discovery of an Armorican Bronze Age arrowhead, the only

Mortillet obtained several objects from the small closed dolmen of Kerouaren to the northwest of Plouhinec, Morbihan. They were a gold "bracelet" 21 cms. long, 14 cms. wide, three gold hooks and a helix of gold wire. With them were found a beaker and a "bracer" 11 cms. long.[212] The report is very summary and the data not adequate to decide whether the bracelet was of the Belz or Rondossec types. Gold hooks are reported elsewhere; le Rouzic recently recovered two hooks in hammered gold from Kercado with the later finds of callaïs and tanged arrowheads.[213]

Objects of copper have been more rarely reported. They are, however, well authenticated in certain instances. In the small gallery of Penquer, Plozevet, S. Finistère, with a bell beaker and a "bracer" was found an unriveted copper dagger with a blunt tang. The other furniture included polished stone axes of normal type of diorite and fibrolite, a greenstone pendant, a conical V-pierced bone button and a very finely worked laurel leafed arrowhead.[214]

A similar dagger was recovered from the grouped chambers of Souc'h.[215] Du Chatellier describes them both as "bronze" but no analyses had been made. They are of the west European type that can be paralleled in Iberia and south Italy and there is little doubt that the Breton, like the former, are of copper.[216]

Metal objects were also recovered from the group of tombs at Lesconil.[217]

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one reported in Loire Inférieure, and a "quadrangular bonze point" in this tomb is surprising since further west callaïs and Armorican arrowtips never occur together. There were altogether seven chambers below the tumulus, but the others were damaged. In the center was a suspiciously Bronze Age "pyramid of stones." We can only conclude that the tomb was either very late and one of the few transition burials in Brittany or else less "intact" than Pitre de Lisle has claimed.

[212] De Mortillet, Une serie d'explorations à Plouhinec, pres Lorient, Mat. 1, 1884, p. 378.

[213] Verbal information and Musée Miln, Carnac.

[214] du Chatellier, P. Nouvelles explorations dans les communes de Plozevet et de Plouhinec. Rev. Arch., 2, 1883, pp. 1 ff.

[215] Ep. Préh., p. 48.

[216] A very small copper "dagger" 7.5 cms. long of similar form was found by du Chatellier in the gallery of Kerandrèze, Moëlan Finistère (9.2 ms. long). The other furniture included diorite celts, a fine flint blade retouched along both sides, a tanged and barbed arrow head (*not* of the Bronze Age type), several pots and sherds, among which was a rough "collared flask," and incinerated remains and cinders among which was found another small and a very corroded metal object which appeared to be the remains of a copper wire ring. Bosch Gimpera cites a copper dagger with bell beaker from Petit Morin, near St. Simon, Ploemeur, Morbihan. (see Rev. Anth., 1926, XXXVI, p. 327).

[217] Exploration de quelques sepultures de l'Age du Bronze, Mem. Soc. d'Em., Côtes-du-Nord, 1883, Nécropole de Lesconil, du Chatellier, P., pp. 37 ff. and Plates 3 & 4.

The forms of the greater number of these chambers suggest that they were constructed in the megalithic period[218] but when investigated by du Chatellier in recent times they showed signs of serious disturbance and may have been used by Bronze Age people. In an oval-chambered passage dolmen in this group (11 m. long with chamber 3 m. by 5 m. and deeply excavated in the ground) two flat, straight-sided "bronze" celts and a "bronze" chisel were found with the incinerated remains in the chamber.[219] In the same chamber were found eight flat amber beads each pierced laterally with three holes.[220] Amber is recorded nowhere else in megalithic Brittany. In form these beads resemble the center pieces of the Danish passage grave necklaces. A copper dagger, 13.5 cms. long, similar to that of Penquer, was found in another chamber in this group. Late Bronze Age objects, i.e. winged celts etc. had previously been recovered by peasants from the neighborhood of this necropolis.

Flat copper axes, similar to that of Lesconil have been recovered as stray finds in Brittany. They are quite distinct from the metal objects of the Bronze age tombs.[221] The condition of Lesconil was, as we have seen, too unsatisfactory to permit of definite conclusions, but since the Bronze Age people entered Brittany with an advanced metallurgical technique, and the unflanged celt was rare, it is difficult to attribute these rough axes to them. It would therefore appear most probable that they do indeed belong to the megalithic culture and are related to the flat copper celts of Southern Iberia (Algarve, Los Millares and the later culture of El Algar) and the Mediterranean.[222]

The V-pierced button from Penquer, which is very rare in megalithic Brittany, tends to confirm the southern derivation of the copper daggers and flat celts.

Copper bangles are reported in Finistère from Souc'h and St. Dreyel. These monuments in the commune of Plouhinec are both grouped chambers. The ornaments of Souc'h were helixes of copper wire, the larger

[218] Cp. cit., cf. Plate III.

[219] Op. cit., p. 40. These celts have not been analysed but are probably copper.

[220] Op. cit. p. 41.

[221] Ep. Préh. p. 44–45.

[222] This suggestion is perhaps weakened by Marseille's discovery of a flat copper celt, 12.9 cms. long, a tanged *copper* dagger, 13.5 cms. long, and the lower portion of the blade of another, 6 cms. long, in a Bronze Age cist—the tumulus of Coet-en-Garf, Elven, (Morbihan), —associated with a riveted Bronze Age dagger, 20 cms. long and 29 magnificent Armorican Bronze Age arrowheads. It is possible, however, to regard this tomb as early and to some extent transitional, for unriveted copper daggers are not typical of these tombs and cannot therefore be regarded as indicating Bronze Age intrusion when found in megalithic tombs.

bracelets had two twists. The smaller "ring" was precisely paralleled at St. Dreyel, where a small flat copper (?) chisel was also recovered. In both tombs typical "megalithic" stone axes, pendants and pottery[223] accompanied these metal objects.[224] A gold helix from Kerouaren, Morbihan, has already been noted.

Helical bangles and rings first appear in Spain at El Argar.[225] They are here of copper, bronze, silver, and gold. Flat unflanged copper and, occasionally, bronze celts are abundant. Since callaïs persists in this culture one is inclined to consider the helixes and flat celts of Finistère and southern Brittany as evidence of Iberian contact at a late period in the megalithic culture of Brittany, when the El Argar culture was beginning its career in Almeria. But helical gold rings also occur in Algarve, where they may also be relatively late (e.g. the cist of Quinta da Aqua Branca) with closed rings of gold, a thin gold strip and an unriveted copper dagger.[226]

The finds here reported undoubtedly indicate an acquaintance with the tools of the western Copper Age and with simple gold ornaments. Flat copper axes, unriveted daggers and gold objects may, moreover, have been in use among the megalithic people for a considerable time before they were deposited in tombs. The existence of so called "bracers" which Siret and Sophus Müller more reasonably regard as whetstones[227] also suggests a use of copper more extensive than is indicated by the grave finds. It cannot, however, be claimed that the megalithic people made extensive use of metallurgical knowledge. The workmanship is rudimentary and poor. Although, on the one hand, the finds imply that they were not entirely ignorant of the use of metals and were therefore capable of identifying and exploiting ores, it is quite certain, on the other hand, that no advanced techniques were introduced or developed during the megalithic period in Brittany.

British Isles

The megalithic culture penetrated the British Isles. Extensive settlements and many ruined chambers are found throughout western and northern Britain. Although there are faint traces of early movements

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[223] Cf. Du Chatellier, Potéries préhistoriques, Plate I, 2; V, 14; IX, 12; XII, 6; II, 2.

[224] Musée de Kernuz, and Ep. Préh., pp. 48 and 229.

[225] Siret, L. Les premiers ages du metal dans le sud-est de l'Espagne, Rev. Quest. Scientifiques, 1888 passim.

[226] O. Archeologo Português, 2, p. 241. figs. 142, 143.

[227] Questions, p. 400; MSAN., 1920–24, p. 223 and Cp. Rev. Arch; 33, 1898, p. 223, the example from Penquer showed signs of such use.

from Central Europe[228] the megalith builders were again the pioneers of higher civilization. The distribution reflects their southern origin but extensive demolition of tombs and the surprising scantiness of grave goods have obscured precise relationships. In Devon and Cornwall, where the first impact of Breton or Iberian migrants might be expected, the megalithic remains, although abundant, have been rifled with such completeness that their typological relationships are quite uncertain.

The open flint-bearing chalk uplands of Wiltshire and the similarly unforested Cotteswold Hills were the scene of extensive settlements. The chambers of this area were built in "long barrows," an elongated mound of a form occasionally found in Brittany.[229] The multiple chambers of many of English and Welsh "passage graves" and the frequency of cremation also suggests that Brittany was the dominant intermediary (fig. 35). But the forms soon degenerated, false portals replace the forecourt and

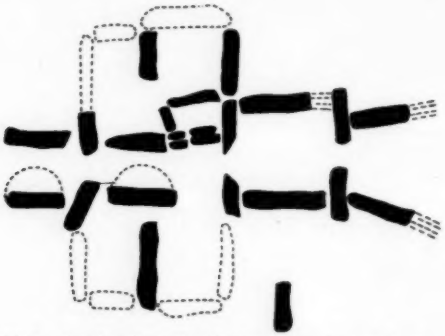

FIG. 35. Multiple chambered tomb of true passage-grave type Nympsfield, Gloucestershire. (after Crawford.)

corridor, and rough chambers were built opening on the side of the mound (fig. 36). Megalithic chambers are lacking in the long barrows of the southern parts of Wiltshire and Dorset. Local supplies of suitable stone are lacking in these more southerly districts and the culture was apparently not sufficiently vigorous to induce the transportation of megalithic blocks over long distances, as was done in Iberia and in Britain itself in the later, Bronze Age, monument of Stonehenge.

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[228] Cf. Childe, Dawn, p. 286

[229] E.g. Mané Lud, & Mont St. Michel.

Megalithic construction is similarly absent in the long barrows of Yorkshire. The burned timber found in these barrows suggests that here the megalithic chamber was reproduced in wood and consumed by fire after the completion of the interments.[230]

But voyagers from the south along the western coasts introduced the passage tomb in a less degenerate form in the remote northerly parts of the island. The chambered cairns of western and northern Scotland are corbeled tombs with precise analogies in southern Iberia. The greater number are found in three groups in the maritime parts of Argyllshire on the west coast, Sutherland, Caithness on the northeastern mainland, and in the Orkney islands to the far north.

FIG. 36. British Long Barrow of false passage-grave type. Windmill Tump. Rodmarton, Gloucestershire. (after Crawford.)

The Caithness cairns which are the most considerable group are of two types—"horned" and round cairns. The longest horned cairns resemble

[230] For early descriptive accounts of the English long barrows see Greenwell and Rolleston, British Barrows, Oxford, 1877; for Wiltshire, Thurnam, Archaeologia, 42, and for Gloucestershire, Sir John Maclean: Trans. Bristol and Glouces. Arch. Soc. 5. More recent detailed surveys of southwestern groups have been undertaken by O.G.S. Crawford, Ordnance Survey, Professional Papers. No. 6. 1922, and The Long Barrows of the Cotswolds, 1925. Wheeler, Prehistoric and Roman Wales, 1927, gives an admirable account of the Welsh megaliths and the problem of their relationship to the English barrows.

long barrows but the splayed entrance characteristic of such long barrows as Long Tump in Gloucester, is here developed into long projections which are repeated on a smaller scale at the short end (fig. 37, 3).

The chambers are well constructed corbeled tombs of oval shape generally divided into three compartments by the projection of megalithic blocks from the walls—a device employed by the megalith builders of Almeria, northern France, and elsewhere. At Camster the passage tombs, two in this instance, opened in the side of the cairn but usually, e.g. Yarhouse, Ormiegill etc., the chamber is built at the wider, higher end of the mound and the passage leads into it between the horns. Other horned cairns are approximately square in plan, e.g. Ormiegill, Garrywhin, Caithness (fig. 37, 1).

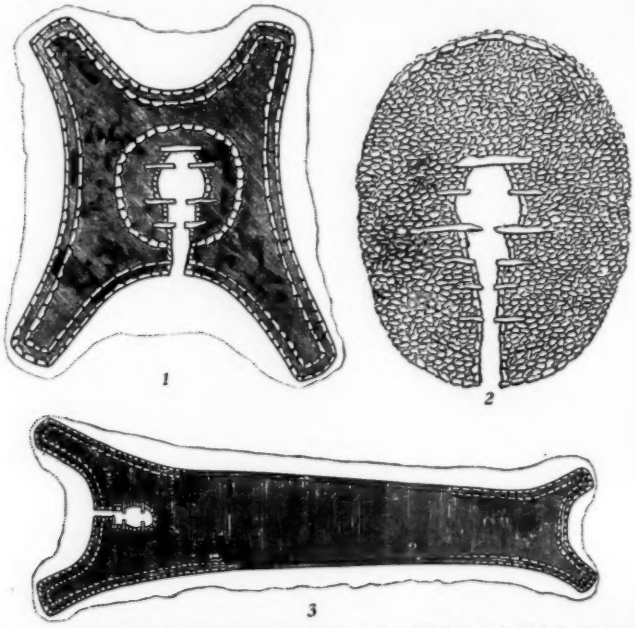

FIG. 37. Chambered Cairn, Caithness, Scotland. 1, Ormiegill, length 66 feet; 2, Yarhouse, 60 feet; 3, Yarhouse, 190 feet. (after Anderson.)

Among the small group of chambered cairns in Sutherland one long cairn at Skelpick has two circular chambers linked by a short passage,[231]

[231] Anderson, J., Scotland in Pagan Times, The Bronze and Stone Ages, 1886, p. 264, fig. 259.

reminiscent of the Iberian type, best known in the Cueva de Romera!, Antequera, Andalucia.

In the same area, large circular cairns are found (fig. 37, 2). These contain chambers of essentially the same type, projecting megalithic slabs being used to separate the compartments of the usually triple chamber. But the form of the chamber is often rectangular and the clear distinction between chamber and gallery sometimes lost. Remarking the architectural degeneration and similarity in plan of these round chambered cairns to the later bronze age mounds in which no chamber was built, Anderson suggested that the round type is later in this area[232] and the round cairns of Camster and Yarhouse certainly show various degrees of deterioration in tomb design.[233] But the scanty furniture recovered does not indicate any considerable difference in period, and the round cairns, like the horned, afford evidence of the careful construction of a double walling which surrounded and limited the mound, similar in purpose and appearance to the wallings found in Iberia and Brittany. The chambered cairns of all forms precede the Bronze Age invasion which introduced the continental beaker, riveted daggers and spear-heads of bronze which are found in the cist and trench burials of the formless cairns of this later age.[234]

While the chambered cairns of the mainland are of types familiar in Iberia and Brittany, the Orkney tombs, of which Maes Howe is the most famous, are still more remarkable. They reproduce in dry-stone walling the Sardinian and Balearic features of rectangular chambers and lateral niches. The latter are rare in Iberia outside Los Millares, Almeria, and the magnificent tombs of Alcalá in Algarve in the west. Such elaborate architecture in these remote northern islands no doubt indicates, as Childe suggests, that they afforded harborage on the circuitous route round northern Scotland by which Baltic amber and English jet reached southern Iberia and the western Mediterannean.[235]

But although there can be no doubt that Iberian and Breton traders and colonists touched at numerous points on British shores, there is a break in the cultural continuity, the greater part of the grave goods that were so characteristic of the continental cultures are lacking. No callaïs beads or bell beakers crossed the Channel, although the latter are abundant in the Channel Islands in tombs of Breton type, and the few potsherds recovered

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[232] Anderson, pp. 263–4.

[233] Anderson, figs. 249–256.

[234] Cp. Childe, Dawn, p. 291.

[235] But the chambered cairns, in some cases, continued to be used in the early period of the Bronze Age; cf. Proc. Soc. Ant. Scotland; 50, p. 221.

in the south, e. g. from West Kennet long barrow, Wiltshire, belong rather to early central European and Baltic groups. Iberian and Breton types are restricted to carinated bowls and occasional greenstone celts found in the Scottish cairns and laurel leaf arrowheads of superior technique which have been recovered both in Scotland and southern England.

It would seem that although expeditions and settlements from Brittany and Iberia reached Britain, the extensive colonization and intercommunication so characteristic of the more southern areas, was attenuated here. Domestic animals, agriculture, and the elaborate funerary ritual were propagated within the island, but external contact and traffic was precarious.

Amber beads and flint daggers of Danish passage grave type are found in the round barrows of the early Bronze Age in Britain and show clearly that the invasion of eastern England by continental beaker folk cut short the earlier Atlantic culture in southern Britain.[236] But the megalithic tradition exerted considerable influence on the invaders who adopted the custom of building ceremonial stone circles and elaborated this megalithic form in the magnificent monument of Stonehenge. The continuance of southern traffic is indicated by the "Iberian" oculi and incised ornament on the limestone "drums" from Folkton, Yorkshire,[237] and the spool-shaped beads that are frequently met with in the barrows of the early Bronze Age, and later in the second period by the segmented blue paste beads of late Middle Minoan type. These have been recovered from the later round barrows of Wiltshire and were imitated locally in Scotland.

But the continental invasion did not so seriously disturb the westernmost outpost of the megalithic culture in Ireland. The magnificent tombs of the eastern coast indicate that the implantation here was part of the process that carried the corbeled tomb up the western coast of Britain. The famous tomb of New Grange is more closely related to the Scottish cairns than to the long barrows of southern England. The carvings of New Grange have long been compared to those of Gavr'inis in Brittany and more recently Breuil[238] and Macalister[239] have instituted a systematic comparison of the carvings on megalithic blocks in Ireland with those of other areas, tracing relationships with Brittany, Galicia and southern Iberia.

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[236] Cf. Childe, Dawn, p. 296 and idem, When did the beaker folk arrive?, Archaeologia, 74.

[237] British Museum Guide, Bronze Age, p. 90, fig. 86.

[238] Breuil, H., Les petroglyphes d'Irelande, Rev. Arch. 1921, 13, p. 75.

[239] Breuil and Macalister, A study of the chronology of Bronze Age sculpture in Ireland, Roy. Irish Acad., 1921.

But although there is little doubt that Ireland played a considerable part in the early traffic of the Atlantic coast, the data are both scanty and conflicting, and it is in the meantime difficult to assess accurately the relations of the Irish megalithic culture. At a later period when separate graves had superseded the megalithic tomb the El Argar culture exerted considerable influence in Ireland, which became a center whence, in connection with the gold trade, late Iberian types were carried eastwards to England and the continent.[240]

The Northern Megalithic Cultures

The megalithic culture of the Baltic is best known in Denmark, archaeologically the most carefully explored territory in Europe, but it extended eastwards beyond the Oder in the north German coastlands of Mecklenburg and Pomerania, southwest into Hanover, Oldenburg and the province of Drenthe in northern Holland, and northwards along the southern and eastern coasts of the south Swedish peninsula.[241]

In Denmark the megalithic tombs are concentrated on the Islands of the Cattegat and the eastern shores of the peninsula and the grave goods are from the beginning blended with central European elements. According to the culture sequence which has been so elaborately worked out for the Danish area the earliest megaliths are rectangular chambers without galleries, buried in round or oval tumuli.[242] Simple in construction and built of massive slabs, the type is most reminiscent of northern Spanish forms and detailed parallels are afforded by tombs in this area. The practices of narrowing the entrance by converging the upright slabs and of closing the chambers with a slab only half the height of the entrance are to be found in both regions,[243] (fig. 38) and in one "dolmen" of this type in N. Spain was found the broken half of a bored axe which may be of Scandinavian provenance.[244]

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[240] Crescentic gold plaques, "lunulae," of Irish type are reported from "dolmens" in Galicia, (Sivelo, R. B. Antiguedades de Galicia, 1875, pl. on p. 110, quoted by Breuil, op. cit., p. 77,) and from Breton Bronze Age tombs.

[241] Cf. Almgren's map of the distribution of the older megalithic tombs of the Baltic region, reproduced in Reallexikon der Vorgeschichte, 8, p. 35, plate 56.

[242] See Sophus Müller, L'age de la pierre en Sleswig, MSAN, 1914–19, p. 9ff. for a brief illustrated account of tomb forms and furniture.

[243] Cf. Sophus Müller, MSAN, 1914–19, p. 14 and fig. 10 with Aranzadi, D. T., Exploracion de siete dolmenes de la sierra de Ataun-Borunda, San Sebastian, 1920, p. 37, fig. 8a and p. 41, fig. 9a; and Sophus Müller, op. cit., p. 14ff. and fig. 11 with Aranzadi, op. cit. p. 20ff. and figs. 2a. and 3a.

[244] Aranzadi, D. T., Exploracion de ocho dolmens de Altzania, San Sebastian, 1920, pp. 17 ff. and fig. 8.

But already in the northern tombs we find a furniture including collared flasks, funnel-neck beakers and amphorae with polygonal battle axes, which derives largely from the warlike invaders who occupied the interior of the peninsula and buried their dead in trenches below mounds of earth, ("Separate Graves").

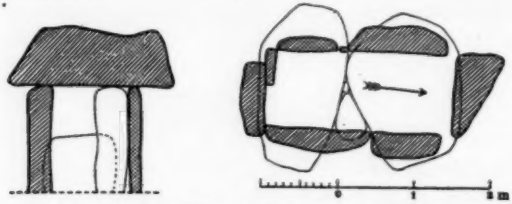

FIG. 38. Dolmen of Starup, Jutland. (after Sophus Müller)

At a later period more elaborate tombs, derived from the passage dolmens of the south, were built with carefully chosen and some cases shaped megalithic blocks. Corbeling was not adopted in this area and even walling in dry stone is rare and restricted to packing between megalithic blocks. The massive oval chambers of the Scandinavian "Chambres de Géants" (fig. 39) form a very uniform group of tombs distinct in plan from the pass-

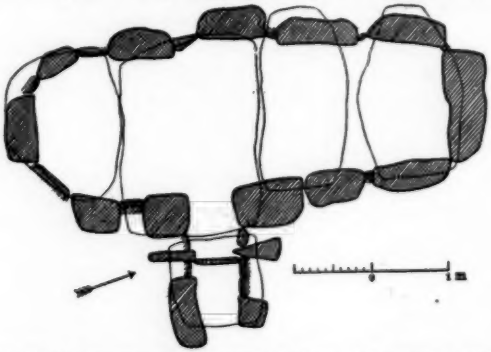

FIG. 39. Danish Passage-grave, Bevtoft, Jutland. (after Sophus Müller)

age tombs of other areas, but lateral chambers are fairly common in Jutland and the triple chambered tomb at Alsbjerg,[245] recalls the plan of the Caithness chambers.

[245] Nordmann, C. A. Jaettestuer i Danmark nya fynd, Nordisker Fortisminder, 2, 1918, p. 118.

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The furniture of these tombs affords the most definite evidence of southern contacts. The characteristic pottery, angular bowls decorated in the "rich style" with "comb," shell, cord and incised ornament, derive both form and decoration from the south and can in many instances be precisely paralleled in Iberia and the western Mediterranean. "Oculi" and rayed circles occur in later bowls of this type which, if not imports, denote the continuing influence of southern types.

The reflex of this southern inspiration is to be seen in the amber ornaments of southern Iberia, often reproducing Danish forms, and the triply bored amber "center pieces" of Lesconil, Finistère.

But central European and Danubian traits are again prominent, as in the angular two-bladed battle axes, the pedestaled bowls and ladles, while the beaker in its continental form begins to penetrate at the end of the period.[246] That the smaller closed dolmens continued to be built in the period of the passage graves is clear from the frequent merging of grave goods. The richly ornamented pottery is found in the smaller tombs of Jutland[247] while "dolmen" pottery has been recovered from passage graves in the same area, e. g. Birkelund and Mogenstrup, East Jutland, the pottery from which included examples similar to that from the earliest known dolmens.[248] Such finds throw doubt on the schematic view that the passage graves are invariably later than the smaller tombs, and, at the very least, there was considerable overlap between the two forms of tomb. Similarly passage graves continued in use for a very long time in some areas and contain in the upper layers of the burial remains characteristic of the later cists and separate graves..

The passage grave builders extended southwards into Holland (Drenthe etc.) carrying with them a tomb furniture in the main characteristic of the Danish area.[249]

At a later period, corresponding with the full Bronze Age in central Europe, a subterranean megalithic gallery with holed stone entry was introduced. This form extended into Sweden and northeastern Germany. In Denmark the culture of these so-called "long cists" is completely merged with that of the separate graves. Beautifully made flint daggers, frequently

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[246] Nordmann, C. A., op. cit. p. 117 and fig. 81.

[247] Cf. Sophus Müller, MSAN, 1914–18, p. 70.

[248] Nordmann, op. cit. p. 116–117 and figs. 66–67.

[249] An elaborate study of the Dutch megaliths is now available in van Giffen's "The Hunnenbedde in the Netherlands," 2. vol., Utrecht, 1927–8. Cp. idem, Les Pays Bas, Region intermediaire, Rev. Anth., 1928, pp. 226ff.

imitating metal forms in the most obvious manner[250] and rough straight-sided pots are characteristic. The problem of the relation of the "long cists" is extremely confusing. The most obvious parallels are afforded by the galleries of northeastern France and since objects of late type have been recovered from some of these tombs it is possible that they afforded an indirect prototype for the Scandinavian "long cist." In the absence of any similarity in grave goods such a relation has generally been rejected and an eastern origin sought for both forms. But the north French galleries are associated with rock-cut tombs and the grave goods are on the whole of southern type while the similarities of the French and Scandinavian galleries are too close to admit of completely diverse origins.

At the end of the long cist period in Scandinavia, bronze tools and ornaments began to penetrate the area and became abundant in the rich bronze age of the north. Here as elsewhere the megalithic culture was overwhelmed by new peoples to whose life and customs it contributed little.

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[250] Cf. Sophus Müller, Flint dolkene i den nordiske stenalder, Nordiske Fortisminder, 1, 1890–1903, pp. 123ff. and plates, for a detailed study of the Scandinavian daggers which are primarily associated with the separate grave culture.

TOBACCO IN NEW GUINEA

By E. D. MERRILL

THE myth that is more or less prevalent among some ethnologists, but not among botanists, to the effect that tobacco was known to and used by the natives of New Guinea previous to the arrival of Europeans in Malaysia, apparently originated with Dr. O. Finsch from whose paper the following passage is quoted:[1]

Nächst dem Betel bildet Tabak (*Kuku*) bei Männern wie Frauen, Alt und Jung, ein fast unentbehrliches Genussmittel. *Die Tabakspflanze ist ohne Zweifel auch an dieser Küste Neu-Guineas eigenthümlich, und ihre Cultur wurde längst vor Ankunft der Europäer in der Weise betrieben, wie ich dies noch bei den Koiäri im Innern und anderwärts an der Küste sah* [italics mine]. An den Missionsstationen hat sich bereits amerikanischer Stangentabak (I, Seite 102) eingeführt und ist im Verkehr das beliebteste Tauschmittel geworden, ja hat an manchen Orten, wie z. B. Port Moresby, den eingebornen Tabak gänzlich verdrängt. Dagegen haben sich europäische Tabakspfeifen keinen Eingang verschafft, sondern man bedient sich allgemein des:

Baubau (Nr. 930, 1 Stück), Rauchgeräth, bestehend aus einer 1.4 M. langen Röhre aus Bambu, an der einen Seite offen, an der anderen vor dem Ende mit einem kleinen Loche; mit eingebranntem und eingravirtem Muster. Maiva-District.

Dieses eigenthümliche Rauchgeräth ist an der ganzen Südostküste Neu-Guineas, von Torres-Strasse bis Ost-Cap, gebräuchlich und für dieses Gebiet charakteristisch. Der Gebrauch ist folgender: Der in eine kleine Düte aus Baumblatt gestopfte, grob zerpflückte Tabak wird in die kleine Oeffnung des Baubau eingesetzt und nun mit dem Munde am breiten, offenen Ende gesogen, bis die Röhre voll Rauch ist. Dann nimmt man das Dütchen heraus, hält die Endöffnungen zu und saugt aus dem kleinen Loche den Rauch ein. Jeder nimmt ein paar Züge und gibt den Baubau seinem Nachbar, worauf das Vollsaugen der Röhre aufs Neue beginnt. Diese Rauchmetode hat eine ausserordentlich starke Wirkung, wird trotzdem aber schon von Kindern leidenschaftlich geübt. Die schönsten Baubau kommen aus Freshwater-Bai und sind durch ihre reichen Verzierungen in zierlichen eingebrannten oder eingeritzten Mustern oft beachtenswerthe Producte papuanischen Kunstfleisses.

Doctor Finsch's direct statement regarding tobacco in New Guinea previous to the arrival of the Europeans appears to me to be merely an

[1] Finsch, O. Ethnologische Erfahrungen und Belegstücke aus der Suedsee. Ann. Nathist. Hofmus. Wien **3**: 327. 1888.

expression of personal opinion, and is not supported by any corroborative evidence. Unquestionably tobacco was known to and used by the Papuan aborigines *long before Europeans established any permanent settlements in New Guinea*, but it must be remembered that Amboina for a long period subsequent to 1520 was the most important European settlement in eastern Malaysia, and that it is only a few miles from the western end of New Guinea, from whence it would be the most simple matter to introduce tobacco and its use into New Guinea; and tobacco was unquestionably introduced into Amboina by the Portuguese, shortly after their establishment there.

Doctor Albert B. Lewis has recently published a pamphlet on tobacco in New Guinea,[2] the general purport of which seems to be the thesis that the practice of tobacco smoking originated independently among the New Guinea aborigines on the basis of a native species of tobacco allied to the Australian *Nicotiana suaveolens*. The following quotations are significant:

> The natives . . . . utilized their own tobacco long before the trader's tobacco became known to them.

The strong closing statement (p. 10)

> In the Arfak Mountains of western New Guinea tobacco has been raised, smoked and traded to the coastal peoples since the memory of man, according to one writer. (p. 1). Altogether the facts seem to point to an ancient use of an indigenous New Guinea species of tobacco probably closely related to the Australian species.

does not seem to be warranted, based as it is on what may be interpreted as circumstantial evidence.

The arguments appear at first glance to be rather conclusive except that apparently the author is theorizing with almost no botanical evidence to support his conclusions, certainly with no New Guinea botanical material for purposes of study and comparison. It seems to me that he has overlooked a very significant fact in that cultivated plants of distinct economic importance are disseminated even among the most primitive peoples with surprising rapidity when once introduced into a new region. As examples, the following American species now universally found throughout the old world tropics may be cited: tomato, tobacco, sweet potato, maize, lima bean, guava, chili pepper, to mention only a few, several of which are everywhere completely naturalized.

Another important fact is that Amboina, very close to the western end of New Guinea, first visited by the Portuguese in 1511 and definitely colo-

[2] Lewis, A. B. Use of tobacco in New Guinea and neighboring regions. Field Mus. Anthropology Leafl. **17**: 1–10, *pl. 1–2*, 1924.

nized by them in 1521, was the first important center in Malaysia for the introduction and dissemination of economic American plants, and the Portuguese were pioneers in this field because of their colonies in the tropics of both hemispheres. They were soon followed by the Spaniards operating through the Philippines, and thus first Amboina, and later the Philippines, became the centers of introduction and dissemination of economic American plants in Malaysia. The long continued Acapulco-Manila galleon service was an important trade route operating continuously for about 250 years previous to 1815, through which medium important economic plants were interchanged between the eastern and western tropics.

Rumphius clearly describes the American *Nicotiana tabacum* in his monumental Herbarium Amboinense[3] but the date of publication (1747) is misleading as the work was published many years after the author's death; the manuscript was completed in 1690, but most of it was written before 1670. It is only logical to conclude that as the true American tobacco was well known in Amboina at a very early date in colonial history, it was thence transmitted with its uses to New Guinea, which is only a few miles from Amboina. One can readily determine from an examination of Rumphius' classical work that even in the early colonial period trade existed between Amboina and New Guinea.

Doctor Matthew Stirling, who knows from personal experience conditions of primitive life in the interior of New Guinea, recently informed me in a personal conversation that in his opinion the tobacco commonly grown and used in New Guinea is the ordinary American species, *Nicotiana tabacum*. This view is substantiated by Dr. W. Docters Van Leeuwen, Director of the Botanical Garden at Buitenzorg, who accompanied Dr. Stirling on his New Guinea trip. Dr. Docters Van Leeuwen, writing under date of June 17, 1929, states that all the tobacco he saw in New Guinea both in the plains and in the mountains was almost without doubt *Nicotiana tabacum*, and that he has seen no botanical material from New Guinea representing other than this species; assuredly neither of these authorities would confuse the characteristic American *Nicotiana tabacum* with any "native species" allied to the very different *N. suaveolens*. Dr. Docters van Leeuwen further states that Dr. Baumée of Buitenzorg is of the opinion that the tobacco grown in New Guinea is *Nicotiana tabacum* but that *N. rustica* may also be cultivated there; both are, of course, American in origin. Plants grown at Berkeley, California by Dr. T. H. Goodspeed, from New Guinea seed, and those recently received from the Brandis ex-

[3] Rumphius, G. E. Herbarium Amboinense **5**: 225. 1747.

pedition to New Guinea all represent a form of *Nicotiana tabacum* with relatively narrow, strongly petioled leaves. This is an inferior commercial type closely approximating the forms that first reached Europe as figured in some of the Herbals published within the first century after Columbus' voyages.

I am merely attempting to substantiate the probabilities that the commonly grown and used tobacco in New Guinea is a form of the common American *N. tabacum*; that it was unquestionably introduced into New Guinea from Amboina shortly after the Portuguese established their factory in the latter island in 1521; and that the use of tobacco, i.e. smoking, was introduced into New Guinea with the plant and did not originate independently in that island as Dr. Lewis seems to infer. The fact that the natives of New Guinea have developed a special type of pipe and special methods of smoking has no bearing on the botanical origin of plant used; for that matter both the Chinese and the Turks have done exactly the same thing, and no one assumes that tobacco was known in either China or in Turkey previous to the discovery of America. Is not the type of pipe and method of smoking tobacco in New Guinea merely an adaptation of the pipe and opium smoking? It would be interesting, in this respect, to determine how long the Chinese have had contacts with New Guinea; it seems probable that this contact may be an old one in view of the fact that early Chinese contacts in the Philippines and in the Sunda Islands antedate or at least approximate the beginnings of the Christian era.

Professor A. R. Radcliffe Brown of the Department of Anthropology, University of Sydney, in answering Doctor Goodspeed's inquiry regarding the use of tobacco among the aborigines in Australia, under date of July 26, 1929 states that it would seem that tobacco was not used in Australia in any way before the coming of the white man. In parts of South Australia and Queensland the natives use a solanaceous nicotine-bearing plant *Duboisia hopwoodii* but this they chew and do not smoke. Native tobacco pipes of a form commonly used in the Malay Archipelago are found only in the northern parts of Australia, Arnheim Land and the Cape York Peninsula. As far as Arnheim Land is concerned the evidence points to the introduction of these pipes and of tobacco smoking by people coming from the Malay Archipelago, and chiefly from Celebes. It would seem that they taught the coastal natives the use of tobacco and supplied them with tobacco in exchange for other products. In Arnheim Land when the natives run out of tobacco they use certain leaves for smoking, which have not as yet been botanically identified. There is no very satisfactory information as to the origin of tobacco smoking in the Cape York Peninsula,

but it seems likely that it is a comparatively recent innovation and comes down from Torres Straits. The general body of evidence is therefore that nowhere in Australia was tobacco used until the habit was introduced from outside the continent within the past two centuries.

My comment on Professor Radcliffe Brown's statement, as summarized above, is that it is highly improbable that the smoking of tobacco in New Guinea was developed on the basis of a native species of tobacco allied to the Australian *Nicotiana suaveolens;* particularly in view of the fact that the aborigines in Australia made no use of the Australian native *Nicotiana*, and further in view of the fact that there is no botanical evidence that anything approximating *Nicotiana suaveolens* occurs in New Guinea.

Ethnobotany is in many respects a fascinating field, but the ethnobotanist is treading on dangerous ground when he develops a theory without reference to botanical material to test it. There is almost no field in the borderland of systematic botany where there are more pitfalls to be avoided in drawing conclusions than in the general field of the origin and dissemination of cultivated plants. Let us hope that sometime field explorers in the general field of ethnology will realize the necessity, not only of taking critical notes on cultivated plants and plant uses among aboriginal peoples, but that they will also realize the absolute necessity of preparing adequate botanical specimens from which accurate identifications may be made.

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OPPORTUNISM AND THE FACTORS OF INVENTION

By H. S. HARRISON

IN DISCUSSIONS concerning the origin and development of simple inventions there are two broad propositions which seem to meet with general acceptance:

(1) That the initial steps can be explained as practical applications of suggestions arising out of the reactions of natural objects or materials to forces imposed upon them, and

(2) That inventions have progressed by summation of small changes.

There has been little consideration of the extent to which the first of these propositions may throw light upon the origin of the evolutionary steps recognized in the second, and the steps themselves are left in a category which has no limits and no subdivisions. A distinction between discovery and invention is scarcely attempted, and although it is obvious that a cross-bow or a battle-axe is more remote from its point of origin than a spear-thrower or a flint knife, there is no terminology by means of which expression can be given to any differences that may be identifiable in the character and number of the inventive steps, or of the factors that have been at work. Yet it is certain that the steps in the evolution of any given artifact cannot have been all alike and of equal importance, and also that whilst one artifact may be the end result of a long and varied series of changes, another may have come to rest very near its starting-point. The expression "difficult invention" is not infrequently employed, but it is not explained how or why the invention is more, or less, difficult. As a rule the meaning seems to be that it is difficult to imagine in what way man obtained the primary suggestion, and the invention may be actually an easy one, given certain, though perhaps unusual, conditions precedent. The discussion of such questions is commonly in relation to the problem of "independent invention," and this expression itself, as ordinarily used, tends to confusion. This is partly owing to the fact that the word invention is often applied indiscriminately to a complex of human activities (e.g. agriculture), of which even the products are not shaped or constructed artifacts, as well as to such artifacts in general; and partly also because the expression is used in such a way as to place on an equality artifacts which are by no means comparable in their complexity and length of pedigree. In speaking of independent invention, moreover, it is rarely that an attempt is made to indicate the

stage in evolution at which the independence is supposed to have become operative.

Much of this inadequacy of thought and expression arises from a lack of terms by means of which the steps in invention can be resolved into something more specific than a series of "gradual modifications." Man can only think when he has words to embody thought, and there are no accepted terms for use in the analysis of inventions. Two or three years ago I put forward[1] an attempted classification of the main "factors" of invention, and I welcome the opportunity afforded to me by the Editor of this Journal of submitting a more developed, though still restricted, scheme on the same lines, for the consideration of American students of human culture.

The attempt to force a popular word into a scientific straitjacket must lead to distortion, and it would be futile to assign exact and arbitrary meanings to the words "discovery" and "invention." As regards the first, however, we must at least limit it for our purposes to discoveries that yield new knowledge of natural forces, and of the nature and reactions of material substances (including both natural objects and human artifacts) under varying conditions; and the process is not one of finding but of finding out. Invention must be left for the moment with its current and vague popular meaning, though it will be suggested later that an invention, in the sense of a certain kind of single inventive step, can be distinguished from a discovery; and also that, while some such steps are directly due to discovery, and are in fact applied discoveries, others are the results of knowledge and some little foresight. In the course of the discussion it will be necessary to hazard some hypotheses and speculations as to the course of development of a few early inventions, but it must be observed that the validity of the general argument does not rest upon the plausibility of the individual speculations. Parts of the argument are, moreover, supported by evidence from modern methods of invention and research, which differ in degree—though in high degree—and not in kind, from those of early Neanthropic man. It will be kind of the reader to attribute any appearance of dogmatism to the need for condensation and short-circuiting, since the writer claims no inspiration for his arguments, and no finality for his conclusions. It is only in fiction that conclusions are final.

Discovery

That man, while still an ape-man, made numerous discoveries that his contemporaries did not make, was due to his arboreal hands and his simian

[1] Man, 74, 101, 143, 1926; 28, 1927; also article "Material Culture" in *Encyclopedia Britannica*, 14th Ed., 1929.

mentality, and to these must be credited his first adventures in tool-using. He hit upon uses for common objects, and even if they were not essential to his survival, or to his welfare, they gave him a new interest in life. As a tool-user, and before he made implements for himself, he was purely a discoverer, imitative and inquisitive. He was also entirely an opportunist, casual and myopic, depending for his progress upon the more obtrusive of the many suggestions thrust upon him by everyday events, and arising out of his manipulative powers and propensities. The raw materials that he found ready for use, such as wood and stone, were those about which he first acquired the knowledge leading later to his metamorphosis from a tool-user into a tool-maker. As time went on he discovered by various chances the existence and the properties of materials which were only obtainable after some process of separation (e. g. sinew), extraction (metals), compounding (alloys), and construction (linear and flat textiles, though these are artifacts). We cannot doubt, for example, that copper was at first an attractive and malleable kind of stone, with which he was familiar as native copper, long before he found out that copper ores would yield the metal. This he must have ascertained by accident, since he could have had no preconception of a relationship between the two, still less of a method of obtaining one from the other. All this was a matter of discovery, and the same is true up to the production of the alloy, bronze, though the more accurate finding out of the best proportions of the two ingredients was due to something more than mere chance; the potentialities of colored earths and shining stones were by this time making an impression, with the result that opportunism was tempered with persistence. The smelting of iron ore, whether preceded by the use of meteoric iron or not, was therefore an outcome of nascent metallurgical knowledge, and we may regard the advance as due to directional research in the sense that metal was desired, even though it may have been copper that was at first expected. The intention was directional, but neither the best methods nor the exact results could be foreseen. It is arguable that directional research—the laying of traps for suggestions—has not yet got beyond this essential opportunism, and never will. If the result of an investigation has been predicted in advance, there is no discovery, but merely a confirmation of theory, which itself is based on knowledge. A discovery is a revelation of the unpredictable, or at least the unpredicted. It is the unexpected that matters, and trees of knowledge often grow from "snags."

It has been necessary to make these preliminary observations on the subject of discovery in order to clear the way for the conclusion that whatever meaning we may attach to the word invention, we must exclude

from its scope the production of materials, whether these are as nearly natural as tempered potter's clay, or as artificial as duralumin or tomato sauce. An invention must have imposed form and not substance only, and it may have artificial structure and mechanism in addition. This limitation excludes also such activities as agriculture and the domestication of animals, since it is not possible to apply the terminology of invention to these adventures in discovery; we must also recognize that there are arts and crafts, such as pottery-making and stone-working, which have developed through discovery alone, though their products have form as well as substance. They have been evolved but not invented, and their evolution has been the result of series of discoveries, out of which artifacts as well as processes and methods have arisen. An earthenware pot or a flint knife is an invention by courtesy rather than by right, but it would tend to confusion to deny the popular title to any shaped or constructed artifact, however simple.

Turning now to the real subject of this essay, we may first consider what part is played by discovery in the origin of artifacts, especially of implements, beginning low down in the scale.

Primary Mutations

If casual pebbles and sticks were the earliest implements, it is clear that discoveries of their properties and uses led to the experience which resulted in their permanent adoption. Either during their use, or by the chance of selection, acquaintance was made with the edge and the point, but, not until sharp stones, wooden clubs, and pointed sticks were shaped intentionally, however crude the methods and results, did man become the tool-making animal of the familiar definition. Just as by this step he crossed a threshold, so also did the implements themselves. The stick with sharpened end, and the pebble fractured to obtain an edge, were artifacts, poles apart from the natural objects picked up and utilized. A pebble was either intentionally broken, to provide a tool, or it was not, and the step from one to the other, viewed objectively, was abrupt and discontinuous, however similar the implements. For such abrupt steps, both initial and progressive, I have suggested the use of the biological term *mutation*, to distinguish them from more gradual and less decisive changes which are cumulative in their effects. Since the first purposeful modification of a natural object to produce a type of artifact was in all cases fundamental, the term *primary mutation* is applicable.

A primary mutation is therefore due to the application of a discovery, made by chance, for the creation of an artifact out of a natural object. The

chipped stone, the pointed digging-stick, the pick, the club, the simple reed blow-tube, and other one-piece implements, may be traced to primary mutations arising out of simple observations and discoveries. Other changes followed on these initial steps. In the beginning one club, for example, was much like any other, except for the accident of choice, and it was only when development occurred that diversity arose, incidentally with the result that the place of origin of modern or recent wooden clubs from all over the world can be determined at a glance. A factor of the greatest importance in the production of this diversity in the form of similar artifacts has been *variation*.

Variations

During the use of the various types of early implements it was found that certain forms were more convenient or effective than others, and a limited degree of standardization was arrived at. Obviously, however, these forms were not preconceived, since they were the results of an opportunist selection of shapes that were due to chance variations. At a later stage, these early *random variations* were succeeded, though never wholly displaced, by *selective variations*, which may have been the result of whim, or of a sense of symmetry, and which passed into *adaptive variations* when the intention was to carry the implement along a line which seemed to be leading to improved efficiency. The intention became directional not only in respect of the production of reliable tools, but also to a very limited extent in the evolutionary sense. It was not directional, however, in the sense that an unknown type was preconceived and adopted as a standard of perfection. Man's intentions may be directional in invention as well as in discovery, but in the devising of his means[2] he cannot get outside his limitations. This may be exemplified by a brief comparison of the early with the late, the simple with the complex, and the aeroplane presents itself as an instructive example.

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[2] Man's ultimate material *aims* are due to, or arise out of, his need or desire for food, shelter, warmth (fire and clothing), and aid in moving himself and his goods from place to place. His *means* are the materials, methods, implements, machines, and other artifacts, that enable him to achieve these aims. Other and less material aims, such as those which find expression through his instrumental music and his personal ornaments, also require material means for their satisfaction. As culture develops, means tend to assume the guise of aims, and aims become aspirations and ambitions. But an artifact is never an ultimate aim, since it is always a means to a material or other end. If space permitted it might be argued that aims—except that of procuring food—as well as means, have their origin in environmental suggestion, though this is perhaps sufficiently obvious.

It may be assumed as at least highly probable that if birds and other animals had never flown, man would never have dreamt of flight, and in his first such dreams he confidingly endowed himself with wings to flap. He became an angel or an Icarus, with no great profit to himself. His aim was directional—for some reason or other he wanted to fly—but for his means he depended at first upon ineffectual imitations, which after long years of trial and error gave rise to a crescendo of successes. The exact nature of the means was beyond his powers of prediction—he did not know what the perfect aeroplane would be like, and he does not know it yet. But he experimented, combined, and calculated, as well as guessed, and men in many parts of the world took pains, and gave their lives, to place themselves in a position to provoke and receive suggestions from the behavior of appliances that gradually approached nearer and nearer to the aeroplane as we know it. The motor-car tells a similar, though less hazardous, story.[3] If man is as far-seeing and forethoughtful as some of his admirers think, why did his first motor-cars look as though the horse had been forgotten—and also prove, often enough, that it should not have been forgotten?

To return to our variations, it is clear that the size and form of any one-piece artifact, or of any such component of a compound artifact, may be altered very considerably by the cumulative effect of a number of changes each small in itself. Larger variations in size may occur, however, but these are such as might have been produced by the summation of a number of small changes, and we may still call them variations, however large they are.

In some instances, variational modifications arise through the copying from other artifacts of features of form, with resultant changes in shape and proportions; we may call this generalized and basic factor *imitation*, accepting it as a "common tendency" of the human and the simian mind. It also plays a part in mutational progress.

[3] Both the aeroplane and the motor-car afford good examples of what I have called canalized opportunism, which occurs at times and places at which for one reason or another many of the intelligent members of a community are bent upon the production of efficient appliances for some special purpose. It has apparently, for example, been manifested by the Eskimo, who must have efficient hunting weapons if they are to live. In their case it is the canalized opportunism of experience; in civilization experiment is added, under such intensive conditions as to lead to an enormous increase in the rate of progress. It may be that the early Neanthropic people who laid the foundations of agricultural civilizations did so by an environmental guidance or compulsion comparable with, though very different from, that which has influenced the Eskimo in the past.

Numerical Mutations

A type of change which in effect is sudden and discontinuous is that which involves a repetition of parts, such as barbs on a spear, spokes in a wheel, and even outriggers on a canoe. In their discontinuity, increases and decreases of such components, viewed objectively, are mutations rather than variations, and they may be associated with the former as *numerical mutations*. They are mutations of a non-inventive kind but they are not dependent on discovery. Addition and subtraction, in such cases as these, may be accepted as arising out of one of these just-mentioned common tendencies which appear to have so much to answer for, especially in pre-Columbian America. If the change in the number of outriggers on a canoe from one to two, or from two to one, may be regarded as a case of numerical mutation, the careful discussion by Dixon[4] of the distribution of the single and the double outrigger-canoe has little bearing on the general question of independent evolution. The mutation is rigidly conditioned, since only one of two results can be reached, and to pass from the single to the double, or *vice versa*, according to circumstances, would involve only one mutational step—perhaps easier from two to one than from one to two—and independent invention seems not too improbable.

Free-mutations

Many implements of simple types may be regarded as resulting from a primary mutation, followed by variation, and this is sufficient to account for the forms of most stone implements; methods of working (percussion, pressure, grinding) do not concern us here, since they are due to pure discovery. The earlier flint hand-axes of the Old Stone Age had a thick butt for grasping, and in spite of differences in size and proportions a considerable degree of standardization had been reached, at the end of one line of variation. The type was an "expression point", and when the edge had extended all round the margin of the tool it was on its way to a later expression point, the sharp-rimmed ovate. This would almost seem to require a haft or a holder, though there is no evidence that it was ever mounted. It may be that the first "invention" of a holder or grip was associated with this or with some simpler form, for the protection of the hand against a sharp edge in the wrong place. The first step may have been the hasty seizing of a handful of moss, or a loose piece of skin, to interpose between the hand and the flint, and so the discovery came within easy range. However the idea arose, the first such grip attached

[4] R. B. Dixon, The Building of Cultures, 1928.

to a blade, with permanence in view, constituted a step which cannot be regarded as a variation. It was a decisive discontinuous step, of a mutational character. If, moreover, it was the crystallization of an expedient, and was not due to imitation or transfer of a known device, it was what may be called a *free-mutation*. Whereas, therefore, a primary mutation (initiating a type of artifact) arises out of a discovery made in relation to a natural object or material, a free-mutation is a modification affecting an existing artifact, and is based upon a discovery made during its use or manufacture. Both these types of mutation are due to discovery, and their application demands only such skill and ingenuity as is possessed by the maker, who is not a prophet but an opportunist. He is scarcely even an inventor, since he looks no further ahead than the immediate step that he has stumbled upon.

Clear and demonstrative examples of free-mutation are not easy to specify, owing to our ignorance of the early stages of development of ancient types of artifacts. The harpoon may well embody one of these, however, since it must be regarded as a derivative of the spear, and since the device of the detaching point is clearly not a product of variation, nor in all probability of cross-mutation (see below). The exclusion of the possibility of the spontaneous generation of such a device—and even of devices that are in appearance much more obvious—in the human mind is fundamental to the argument throughout this paper.

We may suppose that spears with attached bone (or wooden) points lashed to, or both fitted into and lashed to their shafts, were used against aquatic animals, and that the point sometimes broke away, with resultant loss; it may be that the method of tying sometimes allowed the lashing to become partly unraveled, the point leaving the shaft but remaining entangled with the line, which held also to the shaft. Another possibility is that the lashing was specially devised to prevent the loss of the point, if this broke away. In any case the observation was sooner or later made that a detaching point, which remained connected by a line with the shaft, was a useful feature in a spear to be used against aquatic animals, and harpoons were intentionally made with this end in view. The discovery was due to accident, perhaps often repeated before it was purposefully utilized, and its application comes within the definition of a free-mutation.

Free-mutation may well be the explanation of the unusual type of spear-thrower, with socket instead of peg for the spear, found in New Guinea, and formerly in use in one or two other island groups of the Pacific. Here we may suppose that the "translation" of the implement from wood into bamboo gave rise to the chance discovery that the fitting of the

spear into a socket was at least as convenient for discharge as resting it against a peg, and that the method of construction was better suited to the nature of the new material.

Many other speculations might be made as to the interposition of free-mutation in the development of early implements. The first angled-hafting of a stone hand-tool for the production of an axe may have arisen by free-mutation, though in later developments of this kind of hafting another type of mutation was no doubt involved, of a nature to be presently discussed.

An instructive appliance for consideration in relation to variation and mutation is the pestle and mortar. It would appear to be safe to assume that the first mortars were hollows produced on rock-surfaces, or on large blocks of stone, by pounding hard seeds with a heavy pebble. Slow as the actual production of a depression may have been, it was as much accidental, or incidental, as the fracturing of a pebble by a chance blow, and it only appeared as a primary mutation at a later stage, in the pecking out of a cavity in imitation of those that had been produced as by-products. The pestle may have owed its elongated form to recognition that the deeper the cavity the longer should the pounder be, and the mutation by which the artificially-shaped pestle replaced the natural pebble may have been considerably later than that which gave rise to the first shallow mortars; it seems probable, however, that elongated pestles were first made in wood. There were obviously opportunities for variation in relation to the width, depth, and other proportions of the mortar, and to the size and proportions of the pestle; in the further evolution of the two parts of the simple stone appliance no other factor need have been at work.

Substitution

At some stage or other, however, possibly owing to a shortage or absence of suitable stone, wood was used instead, and here again we meet with that factor of ***substitution*** or ***translation*** which has been of fundamental importance in invention. A new material, at first treated as nearly as possible in the same way as the old, and made into similar shapes, reacts in a different way, and reveals new openings to the opportunist. This factor is too well known to call for further exemplification, but we may note in passing the enormous signification of the substitution of metal for stone, and of iron for copper and bronze. In the case of the pestle and mortar the immediate outcome was not very striking, though wooden pestles and mortars could be made of larger size, were more readily portable, and more easily shaped.

Cross-Mutations

In one direction, however, the new material gave an opening for a mechanical development. In some of the appliances from eastern and southeastern Asia especially (though not exclusively, since there are similar forms recorded in eastern Europe) there is attached to the middle or the upper end of the wooden pestle, a beam or bar projecting horizontally at right angles; this beam is balanced on or attached to a support or fulcrum in such a way that pressure on its end raises the pestle, which on release falls back into the mortar, and thus performs its function. The working of this simple type of mechanical pestle is usually done by man-power, but the addition of further mechanism enables animals or water-power to be utilized. As regards the pestle with lever, there is no conceivable way in which the latter could be developed on the pestle by variation, and the change was therefore a sudden and discontinuous one—a mutation. Nor can we imagine that any method of using the pestle itself led to the idea of adding a lever by free-mutation. This must, in fact, have been in use in some other connection, and its application to the pestle is a good example of that process of transfer or hybridization, with adaptation, for which I propose the term *cross-mutation*. It should be noted that it was the translation of the pestle from stone into wood that made mechanical improvement relatively easy, not only as regards the simpler type worked by man-power, but also those more developed forms in which an animal or running water did the work. We may compare with the levered pestle, the levered corkscrew of modern times, though in this case the cross-mutation was less simple.

For another cross-mutation we may examine the development of another food-appliance, the rotary quern. It may be assumed that various types of push-quern were evolved on the basis of a primary mutation, followed by variation. At a stage when one of the less specialized types—and it was from such types, as in the animal kingdom, that new departures took their origin—was in the form of a lower stone upon which was rotated an upper stone almost as large, but having no localized articulation with it, there appeared the familiar axial peg of the rotary quern, passing into or through a hole in the upper stone. Here again it is not possible to see how such a feature could have arisen either by variation, or by a discovery made during use or manufacture of the hand-mill. We are entitled to regard the improvement as due to the influence of some other rotary appliance with pivot or axis, and it is conceivable that the potter's wheel supplied the necessary suggestion. In any case it was clearly a cross-mutation, as defined, though perhaps the passage of the hole right through the upper stone, for feeding-in the grain, was the result of a later free-mutation, and the same may be

said of the hand-hold in the form of a stick fixed in a hole in the upper surface of the upper stone.

Free-mutations and cross-mutations are transforming steps in the evolution of an invention, in greater or less degree, since they change its structural or mechanical character. Often the question as to which type of mutation was responsible in any particular case is impossible to decide, but the fact that a mutation effects a significant change, of a determining character, places it in sharp contrast with variation, which may lead to nothing beyond variety of form. From the stage at which a mutation has intervened, variation may, however, carry an invention along several different lines, and on one of these there may be developed a feature of form which promotes the discovery or forecasting of another mutation. It must be noted that none of the simpler appliances with which we are concerned can have had many mutations in its history.

Change of Function

A subordinate factor, which has nevertheless had some influence in the development of certain inventions, is that of *change of function*, with which may be linked that of change of method of use. It seems probable, for example, that the digging-stick was earlier than the spear, and that its occasional use as a stabbing weapon may have led to variation in the direction of greater length to form a lance or javelin. If the plough is a derivative of the pick or hoe, as is usually assumed, the first step was to drag the simpler implement over light soil to produce a furrow, instead of using it for hacking up the ground and breaking clods. In this case the change was of importance, since it initiated the development of an appliance of some complexity. Again, the first adze may have been a hoe with stone or metal blade. Assuming the development of the Asiatic fire-piston from a tubular instrument used for other purposes (see below), the initial change of function as well as of method of use is particularly clear, and the same is true if the first fire-drill was a boring drill, as may well have been the case. Such changes would usually be followed by variations and mutations.

The basis of change of function is discovery, of a character similar to those which gave rise to primary and free-mutations, and it may have been an easy and likely discovery (plough), or an apparently unlikely one (fire-piston). It must be observed, however, that although a discovery may be easy and obtrusive, this is no guarantee that it will be applied and developed. A pastoral or agricultural people might make the discovery that pellets could be blown through a hollow reed, but this would not be likely to lead them to the development of the blow-tube, used with poisoned darts. Simi-

larly, a people using the pick in simple plant-cultivation might easily discover that it would produce a furrow when dragged through the ground, but this would not of itself make the plough inevitable. Many beginnings must have come to an end before they got a start.

Environment

If space permitted it would be interesting to discuss the question of limiting and guiding factors in invention, but these are many and varied. The nature of materials available is obviously of prime importance, and this point may be touched upon in connection with the influence of environment.

The effect of similar natural environments in producing similar human reactions may be conspicuous in relation to general mode of life, but in its bearing upon the detailed nature of the artifacts evolved it needs examination. Two jungles or two deserts in different parts of the world may be closely similar climatically, but their animal, vegetable, and mineral products may be so different as to influence greatly the nature of the suggestions that become obtrusive. Since man actively pursues his ends, but casts about him for his means, a small difference in the character of a material—still more its absence or rarity—may be a determining factor in the hit-or-miss upon which the origin and development of his artifacts has often depended. Emphasis on environmental similarities, as giving rise to similar inventions, is also apt to ignore the historical and prehistorical bases upon which a given culture has been built up.

Many inventions have only been arrived at along a course that was predetermined in the limitations of the human mind. The loom, for example could only have been produced by a people who already made flat textiles in some more direct way, the spindle was a necessary step in the evolution of the spinning-wheel, and the oar and rudder were dependent on the pre-existence of the paddle. With the evolution of culture the natural environment becomes of less importance than the artificial.

The Objective Point of View

In this attempted analysis of the inventive process, an objective point of view has necessarily been adopted. Greater stress has been laid upon the ultimate responses of the human brain and hand to the reactions of the inert materials and artifacts, than upon the transitional mental stages which must often have intervened between a first discovery and its practical application; or between the first inkling of the possibility of a cross-mutation, and the carrying out of the transfer and adaptation. It must be

accepted as highly probable that in early times especially, man needed frequent repetition of a suggestion before he adopted it—this is still true, as advertisers demonstrate—and that innumerable suggestions must have fallen on stony ground and failed to germinate. Often, no doubt, as in our own time, it required the exceptional man to make the discovery or invention, and force its adoption on his tribe.

To picture a free-mutation, such as that by which the harpoon arose from the spear, as a single objective event arising out of a single subjective discovery, is to err by over-simplification. The same is true to a still greater extent with regard to cross-mutations, as so far defined. For example, after the first method of angled-hafting had come into use in the tool to which it gave rise, (say a hammer-stone held in the bend of a withy) it may well be that the second application of the method, to form another tool, (say an axe similarly constructed) was a direct transfer, but as other tools hafted in this way were produced the "principle" became established. In this and other directions there was accumulated a number of methods and devices—constituting a body of knowledge—that could be drawn upon for the improvement of artifacts that had reached a stage when their construction suggested the possibility of further development; and insofar as the term cross-mutation implies direct transfer it exaggerates the individuality of the process. We must suppose that early man, as soon as he had unconsciously achieved the possibility of cross-mutation, found room in his mind for simple practical ideas upon which he could draw when opportunity offered. His cross-mutations became less and less a matter of direct transfer and adaptation, and more and more an exploitation of the stock of knowledge of his time and circumstances. No Edison can do more, except insofar as during his inventive efforts he happens on fertile discoveries.

Mutations and Invention

It is evident that cross-mutation, which is based on transfer and adaptation, is a process that involves no new discovery, and does not depend on chance. In its material application it is a fulfilment of a prediction, however simple, and it is therefore the result of foreknowledge and foresight, however elementary. These qualities are, however, those which we expect of an inventor, and if it were necessary to define the meaning of the term "an invention," in the sense of the single real inventive step, it could be done in the same terms as those which define a cross-mutation. Primary and free-mutations, on the other hand, involve no foresight and no prediction, since they are based on happenings that are unexpected, and consist in appreciating a discovery and adopting it for the production or improvement of an

artifact; here the step is not "an invention," if we are so rash as to attempt to give this term a precise meaning.

Since cross-mutation could only begin to play a part in invention when there were devices or features which admitted of transfer from one artifact to another, it is obvious that in the early days of man there was little opportunity for the intervention of this factor. He was only beginning to build up appliances which embodied transferable features, and primary mutation, free-mutation, discovery, and variation had to pave the way to cross-mutation. Modifications of *form* through the "influence" of one artifact on another may be regarded as merely a matter of imitation, which rises to the level of cross-mutation only when construction and especially mechanism are involved. We are familiar with the fact that modern invention concerns itself mainly with mechanisms[5] and machines which comprise components that are movable in relation to each other, and this is the most important field of cross-mutation. If we exclude imitative modifications of form alone from this field, we may allow on the fringe of it those mutational changes which affect construction. It was in this marginal territory that man made his first efforts in cross-mutation, and perhaps the earliest of all were such transfers as those arising out of his knowledge of ways of attaching two components together to make one artifact, methods of hafting being among the earliest. As this knowledge grew, and as he became familiar with tangs, sockets, sleeves, perforations, shouldered hafts, and the like, he was able to extend and combine such features for the improvement of constructed implements of many types. Later still, with the development of mechanisms, such as those in which rotary motion was utilized, other possibilities opened up, and his cross-mutations involved a greater ingenuity and foresight. He became an inventor in the modern sense of the word, insofar as it is definable. In our own day cross-mutations are not so simple as they were, and transfers are made of mutational and variational complexes, the analysis of which involves research into technological literature and Patent Office records. The origins of such mechanisms as pulley-systems, ball-bearings, universal joints, differential gears, gyroscopes, to select a few at random, need not be entirely matters of speculation, however, and investigation would reveal something of the extent to which chance discovery and cross-mutations have been active in their pro-

[5] It must be borne in mind that any implement must be considered in relation to the work it is intended to perform, and that, for example, if movement of another material object is the immediate end in view, the implement and the object may together form a mechanism. This is the case with the spear-thrower and the spear, the bow and the arrow, and even the corkscrew and the cork.

duction. To an enquirer of two hundred years ago the problems would have been far less numerous and far less difficult of solution; little more so, indeed, than they would have been two or even four thousand years ago. In modern times too many anastomosing paths have been trodden by too many people for single footprints in any direction to stand out conspicuously.

Primary mutation is scarcely possible in modern invention, while free-mutation is difficult to identify, though it must, for example, have played a part in the evolution of the gliders from which the aeroplane developed. Discovery in relation to materials and natural forces is always with us, and its running contribution to the achievements of invention in modern times needs no emphasis. Substitution is still an important accessory factor in invention, but discovery and cross-mutation are predominant.

It may seem that even if discovery is still dependent on opportunism—calculating and persistent, the opportunities being trapped and ambushed—invention has passed beyond this phase. This is not so, however, since cross-mutation can only come into action in relation to an appliance that chances to have reached a stage at which it can profit by a transfer of a known device, and since research in one direction may happen to produce a mechanism or machine at the right time for its application to another appliance. The internal combustion engine and the glider—both mutational complexes—afford a case in point. Opportunism is no longer purblind and obtuse, but it is still a mainstay of invention as well as of discovery. The intelligence and ingenuity of man come into action in the recognition of the opportunities, as well as in the tests and experiments out of which they arise, and in the selection or the working-out of the methods by which they can be made to bear practical fruit.

We may deduce from the foregoing that directional invention (as distinct from that directional research which is the quest of discoveries) is dependent on cross-mutation, and that it began with the first mutational transfers, perhaps in Late Palaeolithic times. Not until within the last two hundred years, or less, was material culture so far advanced and so progressive as to enable us to speak of an "age" of directional invention and research, marked out from the earlier ages by its concentration on material objectives, by the variety of its methods and materials, and by its utilization of natural forces artificially evoked and controlled. The "tank" of today, and the war-chariot of some 5000 years ago, are both, however, due

[6] By "man" is here meant Neanthropic man, and more especially the stock that was responsible for the evolution of the chief elements of Neolithic culture. The evidence suggests that Palaeanthropic man was much slower in the uptake.

to the reactions of the human mind to environmental stimuli, and there are no grounds for the assumption that the mechanism of man's mind has undergone a change.[6] In the course of time he has added innumerable artifacts to his environment, and he has accumulated and recorded knowledge, with the result that he now starts his discoveries and inventions from a far higher level than did the ancient Sumerians or our own Elizabethans. But it is a difference in training and in starting-point, and not in the essentials of the method of progression. Experiment is experience sharpened to a point—useful as a digging-stick, but not as a divining-rod.

Independent Invention

The bearing of the analytical method upon the vexed question of independent invention cannot be discussed in detail, but it may be suggested that its adoption would at least enable the "evolutionist" to gauge the depth of his evolutionism, and it might do even more for him than that. One or two examples of the application of the method may be roughly outlined.

The fire-piston in Europe and Asia is perhaps the most frequently cited instance of (assumed) independent invention, and the evidence is insufficient either to confirm or disprove the assumption. For the sake of argument, let it be accepted. In Asia the instrument must have arisen through the use of some tubular appliance, though there is no agreement as to whether this was the tube-bellows, the pestle and mortar for areca-nut, the blow-tube, small brass cannon, or some other tubular artifact. The discovery that a forceful thrusting of the closely-fitting rod down the tube led to the production of fire, could only have been made by chance, perhaps in the attempt to remove an obstruction from an appliance in use, or in course of manufacture. It was a simple discovery of a phenomenon in itself as "natural" as the sparking of two pieces of iron pyrites—though far less likely to come under notice—and we may regard the fire-piston as a result of free-mutation, by which there was at first a change of function of the artifact that promoted the discovery. Subsequent modifications of form and material do not concern us, since there are no non-essential similarities that we need consider between the Asiatic and the European types—the significance of the assumed independence rests entirely on the independent discovery and exploitation of the inflammatory possibilities of the sudden compression of a body of air in a confined space.

In Europe the phenomenon appears to have been discovered during the use of a compression-pump for the charging of air-guns, and the appliance had therefore been directly—though unknowingly—adapted for

the production of heat. Here again a chance discovery gave rise to a free-mutation, in this case certainly associated with a change of function of the compression-pump, at any rate during the early confirmatory experiments. That the discovery not only became the basis of a lecture experiment, but also gave rise to a personal or domestic convenience, was mainly if not entirely due to the fact that at the time of the discovery (about 1800), there was something of a hue-and-cry after better methods of fire-making than the flint-and-steel. If it had been delayed until after friction matches had been produced, in 1827, it is probable that the evolutionist of today would never have thrown a favorite controversial missile.

The fact that in Southeast Asia there were several kinds of simple tubular appliances in common use cannot be put forward as evidence of independent evolution of something in the nature of a compression-pump, an instrument of long and varied pedigree. The independence consists essentially in a chance discovery, made in two regions, of a physical phenomenon, and while we may be surprised that the discovery was ever made in Asia (since we find it difficult to imagine exactly how it was made), it is easy to see that in Europe it was inevitable, given the kind of apparatus that was in use. As regards the application of the discovery for the production of the Asiatic fire-piston, we may perhaps associate it with a certain local open-mindedness in relation to methods of fire-making, which are particularly varied in the Southeast.

The case is one in which coincidence has been at work in respect of three factors:

(1) "Tubularity" of artifacts.

(2) Chance discovery (depending upon 1) of a natural phenomenon.

(3) Open-mindedness, or special demand, leading to utilization of the discovery.

Even if importance could be attached to similar inventions made independently under contrasting conditions of culture, there is nothing here to strain the long arm of coincidence. Though the coincidences are three, only one of them has any weight, and they do not form a chain such as must be postulated for the independent evolution of appliances in which mutation, variation, substitution, and other factors have played their parts. No diffusionist need pose as an apologist for the duplicity of the fire-piston.

The fire-piston (under the assumption made) may be regarded as a good example of convergence, but if it had arisen in Asia, as well as in Europe, from a compression-pump, also independently evolved, it would have been necessary to compare the lines of evolution in the two cases, to

ascertain the extent to which parallelism had occurred. These lines would only have been ascertainable by marking out points upon them, and this would be dependent upon some system of analysis of invention. Nor would the parallel lines consist of a single pair, as will be realized if we consider the phylogeny of the woodman's axe or the domestic chopper, with iron blade having a horizontal socket, or shaft-hole, for the haft.

Beginning with the primary mutation which led more or less directly to the first chopping-tool, passing through variations in form, and discoveries of methods, leading to a stone celt, hafted, through mutation and perhaps through one or more cross-mutations, in a perforation in a wooden haft, we may trace the production of the horizontal socket through a free-mutation resulting from the bending over into a loop of the long butt of a copper blade (the metal having been substituted for stone), to embrace the head of the haft on one side. Before reaching this stage, however, we have to interpolate the discoveries that led to the use of copper, and the smelting of copper ore. Before the socket became completed we have also to allow for the discovery of a method of casting. As far as essential form is concerned this gives us the woodman's axe, and omitting bronze from the story, as being on a side line, we have still to add the discoveries that led to the use and production and working of iron. The fire-piston is more simple than it seems, while the axe is more complex. As far as I am aware no one has upheld the independent evolution of the axe of the type in question in two parts of the world, from the very beginning of its initiation in an edged pebble, but even to start from the stone blade held in its perforation would demand more than one series of evolutionary steps arranged in parallel, or, as has been suggested in the case of the socket of the shaft-hole copper axe-head in South America, a striking demonstration of convergence.

It will be noted that in this, as in other cases, discoveries of method and processes have to be taken into account in dealing with inventions, since form is dependent upon method of shaping, while material may call for processes of extracting and combining. Evolutionary parallelism in form, construction and mechanism may also require parallelism in development of method.

A facile assumption of the frequent occurrence of independent invention ignores the many convergent influences that may be needed, even in the case of artifacts that appear to be simple; the assumption itself seems to depend upon an uncritical belief in the widespread originality of human thought and action, proceeding on lines which are more rather than less predetermined by those irresistible common tendencies which have never

been defined. But man is not an originator, since his vision ranges no further than what is known, or than what can be deduced from what is known. Even his imagination has not the freedom of the skies. His discoveries are gifts of the gods, earned or unearned increment, and by cross-mutation he is able to adapt and combine the material outcome of old discoveries for the production of what is new. For his ground-work he relies upon social and individual memory, which may or may not be embodied in artifacts and embedded in written records. He departs from his latest model with trepidation, and is only reassured by success. He is also blinded by it, and forgets the fumblings of his predecessors and himself.

If for the independent evolution of a single type of artifact it is often necessary to draw a big draft on coincidence, there is one case in which the necessity results in an oppressive overdraft. The New World appliances and artifacts which correspond closely with those of the Old World, and for which independent origin is claimed, vary in number but are seldom few, and most of them are such as would require many coincidences for their independent evolution. If coincidence on such a scale could be accepted, the diffusionist would need to give up his *a priori* case not only as regards the New World, but within the limits of the Old, and the common tendencies of the human mind would again be in the ascendant, subject to control by history and archaeology alone.

In conclusion, since I have presumed to deny originality to my species, I must disclaim it for myself. Many years ago Pitt-Rivers wrote (in 1875) of the flint implements of the European River-Drift,

> They were not designed outright, as the 19th century man would have designed them for special uses, but arose from a selection of varieties produced accidentally in the process of manufacture. . . . One is almost tempted to ask whether the principle of causation lay mostly in the flint or in the flint-worker.[7]

This is the opportunist view here set forth at greater length, and with a qualified extension to include the exception made by Pitt-Rivers. That man's inventions develop by an accumulation of small modifications is too well-established to need support by quotation; this is partly due to the insistence of Pitt-Rivers, and it has been further emphasized by others, especially by Balfour, who has also laid stress upon the great importance of "hybridization." I can only claim to have made the endeavor to carry matters a stage further, in order to show that the "modifications" may be defined and classified in such a way as to aid in the comprehension of the

[7] Lane-Fox Pitt-Rivers, lecture reprinted in The Evolution of Culture and other Essays Oxford, 1906.

inventive process. It is not suggested that it is always, or even usually, possible to analyze an artifact with such completeness as to assign their relative degrees of importance to the factors concerned in its evolution, or to decide what factor has been at work at each point. Variations are more easily distinguished from mutations than are free-mutations from cross-mutations, and there will be uncertainties in most analyses. There does not seem, however, to be any escape from the conclusion that there are real subjective and objective distinctions between variations and mutations, and between free-mutations and cross-mutations, as these are defined in this paper.

Those who regard inventions as the outcome of a common human genius that can far transcend experience and knowledge, and who believe that man preconceives his means as well as his aims and aspirations, will no doubt disagree with much that is written here; but such a view is contradicted by the age-long slowness of the growth of human material culture, which is primarily an outcome of the imitative and enquiring tendencies of the anthropoid stock. Man has often been defined in terms that do not flatter him, but he remains convinced that though other apes have lost a tail, he alone has gained a power of reasoning, and it may at any rate be granted that he is the only rationalizing opportunist known to science.

THE HORNIMAN MUSEUM,
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A STONE CULTURE FROM NORTHERN LABRADOR AND ITS RELATION TO THE ESKIMO-LIKE CULTURES OF THE NORTHEAST

By WILLIAM DUNCAN STRONG

IT HAS long been noted that the presumably oldest horizons revealed by archaeologists in northeastern North America have certain factors in common which rather suggest a simplified Eskimo culture. If such resemblances are not fortuitous, which seems unlikely considering the uniform negative and positive characteristics these cultures possess, they may either be accounted for by Eskimo influence on the early Indian population or by assuming that the specialized Eskimo and northeastern Indian cultures arose from some such common substratum. So long as these early cultures were only found in known Indian territory immediately adjacent to the southern boundary of the Eskimo range in historic times, the theory of direct Eskimo influence seemed most probable. Recent archaeological exploration, however, has extended this earlier stone culture far to the northeast into regions long occupied by the Eskimo. In the light of this evidence the problem assumes somewhat new proportions.

In the course of my two seasons' archaeological reconnaissance in northeastern Labrador, several stone age sites were found that were markedly different from the later Eskimo remains and even more divergent from the present wood and bone-working culture of the Naskapi Indians.[1] That the latter people were comparatively recent comers into northeastern Labrador is evidenced by many cultural factors,[2] and since these ancient sites revealed a stone-working technique rather similar to that of the Eskimo I was at first inclined to attribute their origin to an earlier branch of that people.[3] Since then, however, a wider study of the archaeological problem involved has shown that these Eskimo-like artifacts occur commonly in early northeastern cultures as far south as New York and are throughout associated with certain other types suggesting early Indian rath-

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[1] The new data on which the present study is based were secured while the author was a member of the Rawson-MacMillan Subarctic Expedition of Field Museum in 1927–28, and are published with the permission of the latter institution.

[2] A conclusion first stated by Turner (267, 1894), which is in accord with the ethnological data I secured during the winter of 1927–28. Compare also Birket-Smith, 214–215, 1918.

[3] Am. Anthr., n.s., 31: 235, 1929. *Also* Annual Report, Field Museum of Natural History, 7: 422, 1929.

er than Eskimo affiliation. As a result my opinion has changed and I am now convinced that in this old stone age culture of northeastern Labrador we have traces of an earlier Indian population which preceded both the Eskimo and the Naskapi in the region. The reasons for this change may be clearer when the new archaeological evidence has been briefly presented and discussed in relation to the Eskimoan and the earlier Indian cultures of the northeast.

Three main sites of this early stone culture in northeastern Labrador were discovered in the district between Hopedale and Nain and traces of the culture were encountered elsewhere in the same region. Two sites were on the coast, one at Sharp Hill located at the head of Jack Lanes bay, the other on a large island some fifteen miles south of the same bay on a narrow fiord locally known as Windy Tickle. The third site was in the interior about forty miles west of Jack Lanes bay at the end of a large unnamed lake. It may be designated as Northwest Corners from the trappers' name for a small river that enters the lake near here. This last site was discovered by the Naskapi Indians who directed me to the place. The sites varied in size, surface finds at Windy Tickle and Sharp Hill being made over an area of an acre or more, while the Northwest Corners site evidently represented a small camp, since all the artifacts were found within a space of twenty by thirty feet.

The Windy Tickle site is on a geologically recent beach and while the terraces on which the other two sites were located may be of Pleistocene origin, no artifacts were found there under circumstances indicating their deposition during that period.[4] The artifacts secured at all three sites had for the most part been exposed by the natural agencies of wind and water erosion, but digging in the moss and soil at Windy Tickle and Northwest Corners revealed a few more artifacts near the exposed deposits at depths of from five to ten inches, where hard-packed gravel or granite were encountered. The statement of Jacques Cartier in 1534, that "in all the said north coast I did not find a cartload of earth though I landed in many places," is no great exaggeration, and it is obvious that in such a region depth can rarely be a criterion of age. There were no other surface indications to distinguish these sites which could only be located by the naturally

[4] The great unglaciated region of the Torngat mountains, which Kidder called attention to on the basis of Fernald's botanical findings as a possible location of Pleistocene man, is just north of the region under discussion. I travelled over a part of it by dog sled, but the snow and ice of early spring prevented adequate archaeological examination. It is a high bleak region, at present unoccupied. See Kidder, 74–75, 1927; for the geology of the region, Coleman, 22, 26, 1921.

exposed artifacts. At both coastal sites a very few white, porcelain-like bone fragments were found, but careful digging at the interior site revealed no bone at all. At Windy Tickle a few fire-blackened rocks were found under the moss near bone fragments and artifacts, but there was no other indication of camp débris. The grouping of the artifacts in the wind-blown spaces rather suggested hearth centers and there were probably others in the moss and thin soil which we were unable to locate.

The sites themselves gave some evidence as to the habits of these early people. That at Sharp Hill was located on a terrace overlooking the river and the bay (Pl. 1*a*). It was obviously a native workshop, more chips and rejects being found on the exposed areas (Pl. 1*b*) than finished implements. Exposed veins of quartz on Sharp Hill and a vein of clear chalcedony now covered by about two feet of moss and soil on the river terrace had both been quarried by primitive methods. At Windy Tickle a considerable camp of these people had evidently been located as evidenced by the scattered artifacts, calcined rocks, and occasional bone fragments. Among the latter occurred white, porcelain-like phalanges of a polar bear, suggesting that these early people were hunters of no mean order. The interior site at Northwest Corners was apparently a small caribou-hunting camp located on the high shore of a lake giving a splendid view over two estuaries (Pl. 2*a*). Today the Davis Inlet band of Naskapi often camp near here (Pl. 2*b*) to watch for the migrating caribou which swim the lake. Since these people have only occupied this territory for the last two generations, there seems no reason to assign the older remains to their immediate ancestors.[5]

Chipped stone points of translucent chalcedony and quartz were the most common artifacts at these sites, heavy spear or dart points being most frequent (Pl. 3), ranging from thin well-chipped pieces with a short tang (Pl. 3*a*, *b*, *f*, *g*, *m*), to crude, thick oval points with no tang (Pl. 3 *o*, *p*). One very heavy and crudely chipped point of basalt (Pl. 3*j*) from Sharp Hill was the largest. This artifact rather suggests the point of a spear for large sea mammals. Besides quartz and chalcedony, fine-grained granite (Pl. 3*h*) and red jasper (Pl. 3*i*) were also used in making dart points. A few small arrowpoints were found at Sharp Hill and Windy Tickle, but only the heavier points were found at Northwest Corners. These would be the right size for deer spears and it is worth noting that the modern Indians use ground bone spear heads of about this size for the same purpose. They claim to have always used bone and not stone for such points prior to

[5] Strong, 278, 285, 1929.

a

b

PLATE 1

(*a*) Sharp Hill site at base of hill in center of photograph.
(*b*) Wind-eroded area where artifacts were found.

a

b

PLATE 2

(*a*) Northwest Corners site, looking toward the southeast.
(*b*) Northwest Corners site from the South. Deserted Indian camp in foreground.

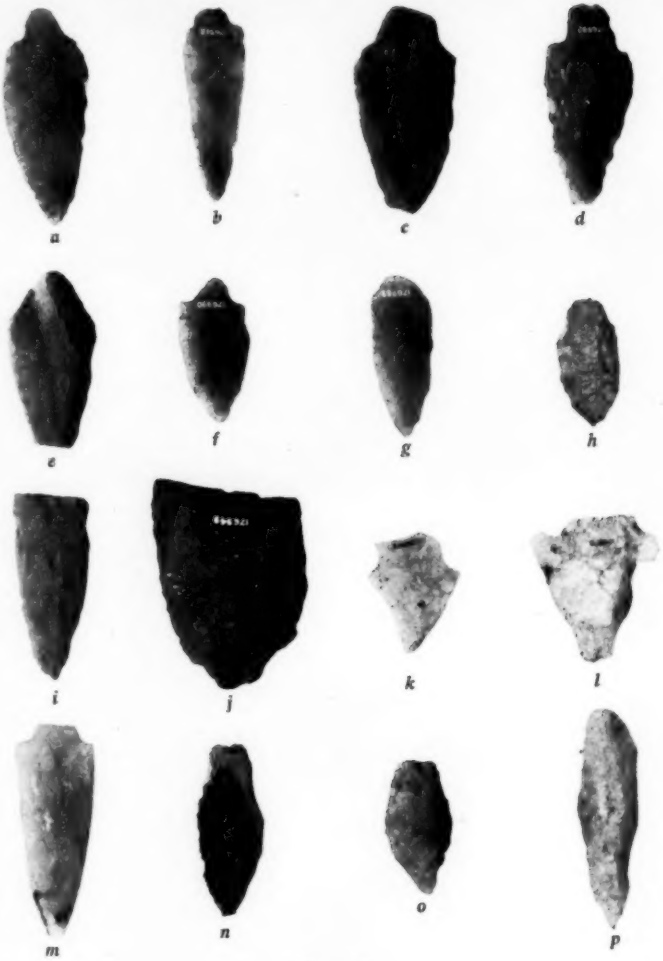

PLATE 3

Artifacts from Labrador stone culture sites. Northwest Corners: *a* (8.5 cm.), *b* (7.3), *c* (8), *d* (7.8), *e* (6.8), *f* (5.8), *g* (7.3); Sharp Hill: *h* (5), *i* (7.2), *j* (8), *k* (4.9), *l* (5.7); Windy Tickle: *m* (8.4), *n* (7), *o* (5.5), *p* (8.5).

acquiring iron. The arrowpoints usually have a small tang (Pl. 4*n-u*) and are often chipped from flat flakes of clear chalcedony or of quartz. There is a general gradation in size from the smallest arrowpoint up to the larger dart or spearpoint. Several points ground from thin pieces of slate were found both at Sharp Hill (Pl. 4*j*) and Windy Tickle (Pl. 4*k*, *l*), thus introducing another technique.

Scrapers were found at all three sites, large oval turtle-back forms (Pl.4*a*) thick, square forms of quartz resembling a plane blade (Pl.4*c-e*), and a plano-convex type with chipped stem (Pl. 4*b*) from the interior site, being the main types distinguishable. At Windy Tickle a beautifully chipped semi-lunar knife of translucent chalcedony (Pl. 4*g*) was found. At Sharp Hill a ground semi-lunar knife or *ulu* of mica schist (Pl. 4*i*) and several fragmentary knives ground from red sandstone (Pl. 4*c*) were also secured. Besides these, two more problematical objects of ground slate from Windy Tickle suggest knives (Pl. 4*f*, *h*). We found only one object of soapstone at any of these sites. This was a triangular gorget from Windy Tickle (Pl. 5*c*) with a small gouged hole in each corner. However, an old Eskimo woman, now dead, who visited the Sharp Hill site many years ago is said to have found at least one soapstone vessel there, as well as a ground stone ulu and many chipped points.

At Windy Tickle I picked up two much weathered and eroded ungrooved celts of oval form (Pl. 5*f*, *g*). The Naskapi stated that two very similar artifacts had been found by them at the Northwest Corners site, but had been lost by the Indian children playing with them. The two from Windy Tickle are ground from metamorphosed igneous rock. At the same site a chisel of altered granite, deeply patinated, was also found (Pl. 5*e*). This was roughly flat or convex on one side and had been ground to a broad sharp edge. It may be worth noting that this specimen as well as one of the celts both show the flattening on one side which seems to characterize the majority of such objects from Nova Scotia, New Brunswick, and Ontario.[6] According to Piers this is an indication of their having been hafted adze-fashion. A short heavy gouge of disintegrating serpentine was found at the Sharp Hill site (Pl. 5*d*). This is an unusually interesting type of implement. According to geologists at Field Museum the extreme decomposition of this specimen implies a considerable antiquity, for serpentine is a very resistant mineral and the disintegration has obviously taken place since the tool was shaped. In addition to the foregoing types the sites yielded many hammerstone or battered nodules of granite, hornblende (Pl. 5*i*),

[6] Piers, 34, 1895.

and quartz (Pl. 5*h*), as well as slate rubbing or polishing stones (Pl. 5*a*, *b*). Especially at Sharp Hill, where an old aboriginal quarry was located, there were many chips and rejects, two quartz points from that site (Pl. 3*k*, *l*) probably being in this latter category. The foregoing include practically all the types of implements found at these sites.

Certain other scattered finds in the region suggest that more intensive work here would reveal other sites of this culture and possibly provide a link between the early stone culture and the known Eskimo remains, all of which seem to be much more recent.[7] Bearing on the problem at hand was the discovery of a large, ungrooved, chipped celt of translucent chalcedony found at a depth of from one to three feet by an Eskimo digging peat at Nain.[8] The technique and material of the specimen, as well as the fact that the site of Nain was first settled by the Moravians in 1771, suggests that the old stone culture was represented here long prior to that time. Two stone adze blades (Pl. 6*a*, *b*) are said to have been found by an Eskimo in a stone grave on an island near Nain, but I was unable to get in touch with the original finder. The first (Pl. 6*a*) is an oval, flat blade ground at both ends but sharpest at the large end; the other (Pl. 6*b*) is rounded at one end, thick in the middle, and ground down smoothly to a broad blade. Both are made of a hard, fine-grained slate. The next three specimens shown in plate 6 were found by another Eskimo on a small island near Zoar bay. The first two (Pl. 6 *c*, *d*) are carefully ground stone adzes, flat on both surfaces. Plate 6*d* is made of green stone, suggesting jade in appearance, and is identical with Eskimo adze blades from Alaska and the central Arctic. Plate 6*e* was found on the same island, but is much worn and heavily patinated in contrast to the others. The material is sand-etched limestone. It rather suggests the woman's stone knives found at Sharp Hill and may represent a different culture from the other two artifacts, which seem to be Eskimoan.

The next nine specimens illustrated in Plate 6*f-n* are well chipped points of red quartzite, flint, basalt, and translucent chalcedony, all of which came from the surface on the eastern shore of Big Island just north of Davis Inlet. They were found by two white boys from the latter place and the collection which they kindly gave to me originally contained some half dozen beautifully chipped points of translucent chalcedony, identical in type with those from Northwest Corners and Windy Tickle sites (Pl. 3*b*, *m*).

[7] Expeditionary conditions were such that most of the archaeological work had to be done by canoe, a slow and ineffective means of travel where such great distances and treacherous channels are involved.

[8] Owned by E. P. Wheeler of Ithaca, New York, and examined by the writer at Nain.

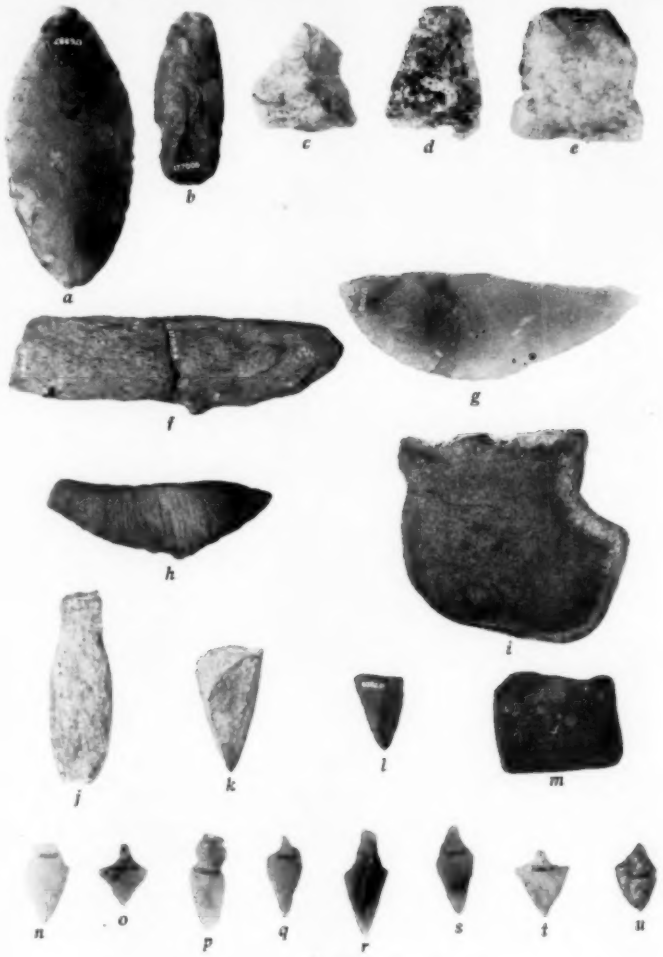

PLATE 4

Artifacts from Labrador stone culture sites. Northwest Corners: *a* (11 cm.), *b* (7), *c* (4); Sharp Hill: *d* (6), *e* (5); Windy Tickle: *f* (12.8), *g* (12), *h* (9); Sharp Hill: *i* (10), *j* (7.5); Windy Tickle: *k* (5), *l* (3); Sharp Hill: *m* (5); Windy Tickle: *n* (3.4), *o* (2.6), *p* (4), *q* (3.2), *r* (4.4), *s* (3.8), *t* (2.7); Sharp Hill: *u* (3).

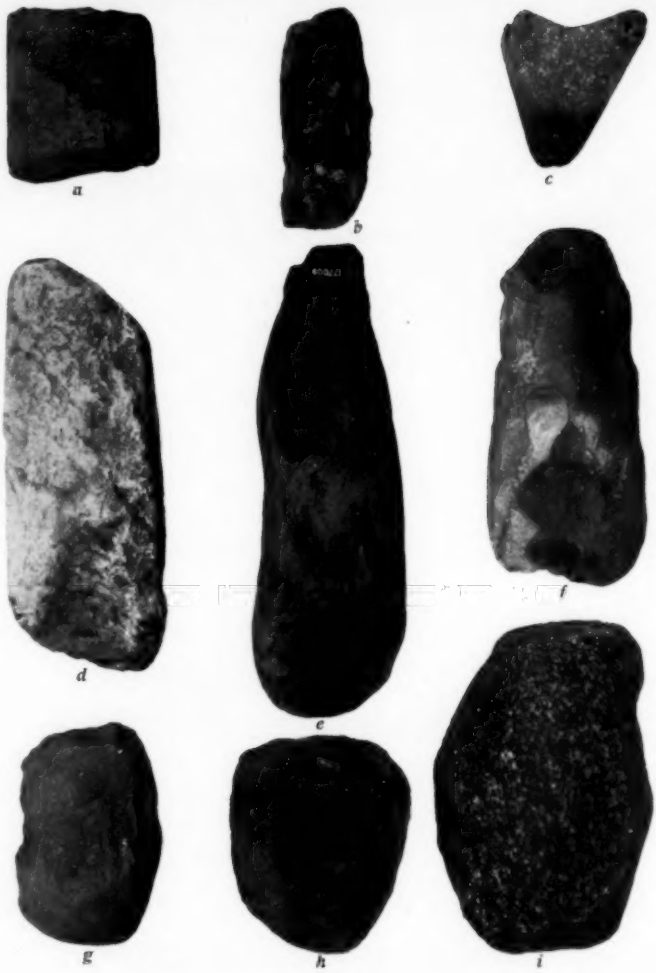

PLATE 5

Artifacts from Labrador stone culture sites. Northwest Corners: *a* (5.5 cm.); Windy Tickle: *b* (8), *c* (7); Sharp Hill: *d* (15); Windy Tickle: *e* (17.5), *f* (13.5), *g* (8); Sharp Hill: *h* (7), *i* (11.8).

Unfortunately these chalcedony specimens were taken by a visitor at our winter quarters. The notched points from Big Island are rather unique in possessing a large tang with deep notches at each side. The type is more characteristic of Indian than Eskimo workmanship, and since these points were found in association with types identical with those from Windy Tickle and Northwest Corner sites I am inclined to believe that they all represent the old stone culture under discussion. They were all found on bare, wind-eroded areas and, according to their finders, were unassociated with any stone cairns or house ruins. The last two small arrowpoints (Pl. 6 *o*, *p*) were found by Eskimo on one of the outer islands near Hopedale; Plate 6*p*, a small point made of translucent chalcedony, is of interest due to its deeply convex base, a characteristic of both Indian specimens from the south and certain old Central Eskimo forms connected with the Thule and Cape Dorset cultures.[9]

There is a striking difference between the sites known to be of Eskimo origin in northeastern Labrador and those we have been discussing. The former are characterized by large, rectangular or rounded house pits, circular or square stone tent rings, and stone graves, gift caches, and box traps on the hills behind the village sites. In front of the house pits or near them are usually small middens made up of masses of animal bones, primarily of the seal but also including those of the whale, walrus and caribou. Most of those we examined and excavated dated from early mission times, that is, the latter half of the eighteenth century, and contained objects showing early Caucasian contact. The bulk of the material, however, was Eskimoan and consisted for the most part of steatite (cooking pots and lamps), bone, antler, and ivory work, with stone implements other than steatite in a decided minority. Like the stone, sod and whalebone houses, stone graves, gift cairns and box traps, the material culture revealed by excavation most closely resembles the Thule and the later Eskimo cultures of the central arctic.[10] The stone artifacts from these Labrador Eskimo ruins resemble those of the old stone culture in the presence of a few broad-shouldered, narrow-tanged, chipped points of clear chalcedony and quartz; square plane-like quartz scrapers; flat polishing stones and hammerstones, features that are widespread in native American culture. Ground slate arrow or spearpoints, stemmed scrapers and ground stone woman's knives were not found at any of the Labrador Eskimo sites ex-

[9] Mathiassen, 2: 164, 1927. Jenness, 432, 1925.
[10] Mathiassen, 2: 163–4, 1927.

cavated.[11] These types occur in the old Thule and Cape Dorset cultures,[12] and may be associated with old Labrador Eskimo sites, although we found none in our excavation. Both the Thule and Cape Dorset cultures, like the known Labrador Eskimo sites, are characterized by bone, antler, ivory, and steatite artifacts, whereas the Labrador stone culture under discussion contains almost nothing of these materials and possesses in addition such unique types as the gouge, ground chisel, and oval celt, which are not at all characteristic of the Eskimo. Moreover, these stone culture sites are entirely without the surface indications or abundant bone débris that mark the Eskimo remains. Certain isolated finds such as the stone adzes previously described, suggest that an older Eskimo culture may yet be distinguished in northeastern Labrador that will bridge the wide gap between the old stone culture and the later bone and steatite-working Eskimo culture. This is a possibility, but until such evidence comes to hand I incline toward the belief that the true Eskimo culture reached northeastern Labrador in much the fully developed form revealed in the eighteenth century ruins. If so, this leaves the earlier stone culture with its Eskimo-like stone *ulus*, ground slate points, and chipped scrapers to be otherwise accounted for.

When we turn to the south and consider the early, especially the pre-pottery cultures, new light is thrown on the problem. Many years ago Lloyd described a site some twenty miles east of Forteau bay at the head of L'Anse du Diable, where aboriginal workshops were located. In many pits in the sand, ranging from those fifty by thirty feet with a depth of ten feet to smaller pits only two feet deep, he found clusters of chipped points and flakes. Other points were found in the vicinity. These hollows were located near quartz veins thinly covered with moss. The points were made of quartz and rock crystal (translucent chalcedony?), artifacts of the two materials being generally segregated on opposite sides of a brook. Lloyd was inclined to believe that these were not made by the Montagnais Indians who lived forty-odd miles inland, nor by the Eskimo who then occupied the coast, but regarded the site as an older Indian workshop.[13]

[11] Hawkes, 95–98, 1915, gives a general description of the old type *ulu* without a tang, but does not figure or describe any from Labrador. All that I found had had iron blades with a bone or iron tang between blade and handle. Hawkes found none of the larger stone tools common to Eskimo culture elsewhere, but assumes that the ancient Labrador Eskimo used them.

[12] Mathiassen, op. cit., 84; Jenness, 432, fig. 4, 1925.

[13] Lloyd, 39–44, 1874. Attention might be called in passing to the small stone ruins at Forteau bay described in the same paper. They seem to have been quite similar to the stone ruins on Sculpin island near Nain, and the empty cairns suggest Eskimo origin.

PLATE 6

Artifacts from various sites. Island near Nain: *a* (11.5 cm.), *b* (7.3); Island near Zoar: *c* (12.5), *d* (7.8), *e* (5.5); Big Island: *f* (4.2), *g* (4.1), *h* (9), *i* (6), *j* (6), *k* (5), *l* (6. 5), *m* (4.3), *n* (3.3); Island near Hopedale, *o* (4), *p* (4.6).

No other types of artifacts are mentioned, and as the types found are not illustrated we may only note the general resemblance of the site to those farther north.

Very recently Wintemberg has reported workshop sites just south of Forteau bay near Blanc Sablon and Bradore where numerous spear and arrowpoints were found amid chips and rejects.[14] The majority of these are of chert and quartzite, many of them being small and delicately chipped, as well as stemmed or notched. Other leaf-shaped forms and plano-convex scrapers are also noted. No finished stone adzes or ungrooved celts were found, although near the Bradore site part of a highly polished stone gouge was picked up. At about the same place sherds of pottery with roulette decorations and similar in type to those from Algonkian sites in Ontario and Maritime provinces were found. According to Wintemberg, the potsherds were associated with the workshop sites.[15] Judging from outline sketches kindly sent me by Mr. Wintemberg, the chipped points are very similar to those from my northern sites. It may be noted that near the Blanc Sablon site human remains covered with red paint were found under an overhanging rock. This is regarded as a Beothuk burial.[14] A detailed comparison of these sites must await the full publication of Mr. Wintemberg's findings.

In southern Labrador at Tadousac on the north shore of the St. Lawrence, Speck found on a high terrace back from the river a native workshop closely comparable to that previously described at Sharp Hill. The site had been exposed by wind action, revealing amid chips and rejects, quartzite blades of oval form and large size, turtle back and square plane-like scrapers, semilunar knives, gouges, chisels, plummets, hammerstones, and ground slate points which were long and slender. The extreme corrosion and patination of these specimens was marked and the majority of them were broken as though by long exposure. No pottery or bone implements were found here. Speck is inclined to regard this Tadousac site as representing a very old proto-Algonkian culture, possibly related both to the Beothuk of Newfoundland and the Red Paint culture of Maine.[16] This site has since been worked by Wintemberg who confirms the absence of pottery and adds that the points were mostly large, crudely chipped, and that there were no stemmed or notched forms.[17] In general characteristics, range of implement types, evidences of antiquity, and lack of pottery this

[14] Am. Anthr., n.s., 31: 333, 1929, and personal communications from Mr. Wintemberg
[15] Letter of May 29, 1929.
[16] 427–33, 1916.
[17] Letter of May 29, 1929.

site closely approximates the stone culture of northern Labrador. It differs in lacking the stemmed and notched points that occur at the northern sites, but the similarity still remains a striking one.

The archaeology of Newfoundland awaits adequate and systematic investigation, but enough is already on record to indicate that the region is of fundamental importance in regard to the present problem. Sites on the northeast coast described by Lloyd[18] are quite similar to those just discussed in Labrador. They represent both dwelling places and workshops, the specimens being covered by the thin soil overlying the granite. Small soapstone vessels, plummets, ungrooved celts, gouges, chisels, ground slate points, hornstone and quartzite arrow and "dart" points with notched or concave bases, small triangular scrapers of quartz and hornstone as well as those with a flat base and chipped stem,[19] rubbing stones, chips and rejects make up the list of artifacts found in these sites. Associated with such artifacts at one site were fragmentary calcined bird bones and a few crumbling human bones.[20] To date pottery does not seem to have been found in any Newfoundland sites. Other dwelling and workshop sites of the same culture have been located on the coast and in the interior.[21]

It has been rather generally accepted that these sites are of Beothuk Indian origin since these unfortunate people, who were exterminated by 1829, were the only permanent inhabitants of Newfoundland at the time of its discovery. The recent work of Jenness and Wintemberg suggests that the Beothuk formerly occupied the adjacent Labrador mainland, and Wintemberg is inclined to believe that there are really two different cultures represented in Newfoundland, an early type represented by the stone gouges and ground slate points and a later Beothuk culture.[22] Later Beothuk burials containing a few objects of European manufacture have been found, often in caves or under overhanging ledges, the skeletons being wrapped in bark and associated with much red ocher. Chipped stone points, small bone harpoon heads, unique bone carvings with geometric decoration, soapstone vessels, birch-bark utensils and iron pyrites are characteristic grave finds.[23] The use of the gouge, the manufacture of

[18] 233–248, 1875.

[19] These are identical with one from the interior site in northern Labrador. Compare Lloyd, plate XI, figs, 4, 7, 1875, with plate 4*b* of this article. Skinner, plate VI, fig. *m*, 1919, shows a similar type from an old New York site. Boas, 388, fig. 8, 1907, shows a very similar hafted Eskimo scraper from Southampton island.

[20] Lloyd, 233–248, 1875.

[21] Howley, 326–330, 1915.

[22] Letter of May 29, 1929.

[23] Howley, 328–335, 1915.

soapstone pots, and the grinding and flaking of similar stone implements[24] rather tend to link the historic Beothuk and the earlier workshop sites, but this is a question that can be more accurately answered on the completion of archaeological work now in progress in Newfoundland.

Since the Beothuk used abundant red ocher in their burials, lacked pottery as well as certain types of implements, and if the older Newfoundland sites can be attributed to them, had other types such as the gouge, chisel, ungrooved celt, and long slate "bayonet" points, they may well have been related to the Red Paint people of Maine whose caches or burials are characterized by the presence or absence of the same traits. As Speck[25] and others have pointed out, the Beothuk were in all probability the last representatives of the early Algonkian (or pre-Algonkian?) population in the northeast. That they were influenced by the Eskimo who reached Newfoundland before historic times seems very probable, [26] and may well account for their highly developed soapstone and bone working in later times. There are, however, certain Eskimo-like characteristics in the older culture which seem quite widespread in the early cultures of the northeast and the significance of which will be discussed hereafter.

In New Brunswick, kitchen middens are found on the coast which are characterized by the presence of shell and bone, although the majority of implements have been found in the interior.[27] Baird notes, however, that stone implements are more numerous in New Brunswick shell heaps than in those of New England.[28] A coastal village site excavated by Mathew at Bocabec consisted of house pits containing oval, chipped scrapers and implements of quartz, semilunar knives, ground slate points, gouges, and very fragmentary bone awls and harpoon points.[29] Certain of the stone implements showed signs of extreme weathering and Mathew was inclined to regard them as representing an older period than the other material. Two types of pottery were also distinguished in upper and lower levels. The specimens from the New Brunswick interior illustrated by Bailey, include heavy, notched and unnotched points, small arrowpoints with a narrow tang, ground slate "bayonet" points, plummets, grooved and ungrooved celts, chisels, pestles, and hammerstones.[30] These are mostly

[24] Lloyd, 236, 244, 1875.

[25] 15, 1922.

[26] According to Howley, certain sites in northwestern Newfoundland characterized by bone and ivory work are quite possibly of Eskimo origin (330, 1915).

[27] Bailey, 7, 1887.

[28] 292, 1881.

[29] 5–29, 1892.

[30] Op. cit., 1–16, 3 pls.

surface finds made on the shores of interior lakes and rivers. Several native quarries where chalcedony was obtained are on record, as well as workshop sites where finished gouges, celts, scrapers, spear and arrowpoints have been found associated with flakes and rejects. Certain of these implements are much corroded on their exposed surfaces and appear to be very ancient.[31] Pottery has been found associated with stone implements at various sites, but the types occurring in such association do not seem to have been noted elsewhere than at Bocabec. Whether a pre-pottery culture can be distinguished in New Brunswick is not clear, but the types of stone implements described from Bocabec and those from the interior camp and workshop sites seem closely comparable to artifacts of the stone culture in northern Labrador.

On Prince Edward Island, Fewkes dug in several small shell heaps, securing two stone celts and an ivory harpoon point similar to others found in Nova Scotia. Pottery is not mentioned in any of the various shell heaps examined. He was inclined to see Eskimo influence in the walrus ivory harpoons but did not believe the Beothuk had anything to do with the sites.[32] The data on which these conclusions are based, however, seem too slender to bear much weight.

In Nova Scotia small kitchen middens are found along the coast and native workshops are rather numerous in the interior, especially near high banks along the fishing streams. These are marked by chipped stone artifacts chips, rejects, and in one case by numerous gouges.[33] In the north, hard, slaty flint, felsite and quartz were used in the manufacture of chipped points, while in the southern part of the province, agate, jasper, and fine-grained minerals found along the Bay of Fundy were more commonly employed. Stemmed, notched, and round-ended spearpoints occur, thick scrapers, many ungrooved celts (often much eroded), chisels, hammerstones, rubbing stones, ground slate points, semilunar knives, a few plummets, and iron pyrites are noted. Toggled harpoons, awls, and knapping tools made of walrus ivory have been found (presumably on the coast). Grooved axes, pestles, stone pipes, and copper knives are rare, while shell artifacts are unknown. Considerable crude, brownish-gray pottery decorated with incised designs has been found, but its exact association with the various types of stone artifacts is not clear.[34]

[31] Mathew, 66, 1900, and Kain, 494, 1902.
[32] 30, 1896.
[33] Patterson, 237–239, 1889.
[34] Ibid., 239–252.

As yet no culture sequences seem to have been distinguished, although a find made during the excavation of a canal at Milton, Queens county,[35] which consisted of slate "bayonet points," stone chisels and gouges, rather suggests the Red Paint culture of Maine and possibly a pre-pottery horizon. Piers calls attention to the fact that grooved axes are rare in Nova Scotia, New Brunswick, and Ontario, while the ungrooved celts found in these provinces are usually flatter on one side than the other, indicating that they were hafted adze-fashion. He stresses the fact that the Eskimo used this type of implement and states that formerly these people occupied Nova Scotia, being driven out by the Micmac.[36] However this may be, there is no doubt that many Eskimo-like artifacts have been found in the region. It would seem probable that this is due both to recent contacts with the Eskimo and to the presence of the old Eskimo-like culture under discussion.

According to Boyle, the numerous semilunar knives of ground slate found in the northeastern part of Ontario were probably of Eskimo origin.[37] Wintemberg is also impressed by the Eskimoan resemblances in these and in the bone and ivory harpoons from the same province.[38] It is of interest that these harpoons are also very numerous in Iroquoian sites, occurring also in post-Caucasian times.[39] The ground slate blades and points found in northeastern Ontario occur in association with pottery bearing an Algonkian type of decoration, stone gouges, ungrooved celts, stone adzes, chipped stone points for arrows, spears and knives (a few of quartz and quartzite), drill points, scrapers, rubbing-stones, and in some cases with slate gorgets, pendants, bird amulets, bannerstones, and stone pipes.[40] Such an association suggests Indian rather than Eskimo affiliation and presents a culture somewhat more complex but essentially similar to the stone culture found in northern Labrador. Since Ontario is much nearer to the sources of ceramic diffusion, the occurrence of pottery is not remarkable, although a later cultural stage is probably represented here than is the case in northern Labrador and certain other regions in the northeast.

The pre-Neutral or Algonkian sites excavated by Wintemberg in Oxford and Waterloo counties differ from the above in the presence of cylindrical roller pestles, grooved stone axes, bird amulets, boat stones, stone tubes,

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[35] Piers, 34, 1895.
[36] Ibid., 37–47.
[37] 22, 1906.
[38] 36, 50, 1905.
[39] Wintemberg, op. cit., 54.
[40] Personal communication from W. J. Wintemberg, May 29, 1929.

and earthenware pipes.[41] Semilunar slate knives, ground slate points, and gouges are lacking, while the great majority of chipped points are of chert. These two cultures are evidently related, but the Eskimo-like culture traits appear in the former and, so I would presume, earlier of the two. Thus, while no pre-pottery culture has been distinguished in Ontario there is in the northeastern part of the province a culture akin to the stone culture of northern Labrador and marked by the same very general Eskimo-like characteristics we have noted throughout the northeast.

Passing farther to the south we find in the Red Paint culture of Maine striking similarities to the early northern types. These sites, found for the most part along the river valleys of Maine, are presumably cremated burials characterized by masses of red ocher.[42] In these caches are found many chipped points of translucent quartzite, which material, according to Moorehead, comes from Labrador.[43] The types are identical with those from Ontario, New Brunswick, Newfoundland, and northern Labrador. Gouges, chisels, ungrooved celts, polished slate arrowpoints or knife blades and more especially slender slate "bayonet points," flat perforated stone crescents, plummets, and rubbing stones are all characteristic.[44] Some fragments of bone have been found, but these were either calcined or extremely fragmentary. The occurrence of iron pyrites and flint nodules for firemaking in nearly every cache have been noted.[45] About twenty per cent of the stone tools have begun to disintegrate, especially where they have been in contact with iron pyrites.[46] The so-called Algonkian sites differ from the foregoing in the presence of pottery; grooved axes; stone pipes; stone tablet-shaped, bone or shell ornaments; etc.[47] They also lack the characteristic Red Paint artifacts. Willoughby[48] and Dixon[49] regard the Red Paint people as probably related to the Beothuk of Newfoundland; Moorehead, on the other hand, suggests that they might be the ancestors of the Eskimo.[50]

In New York the earliest and Eskimo-like culture distinguished by Parker, underlying what he calls the Early Algonkian strata, is characterized by semilunar slate knife blades, rubbed slate double-edged knives,

[41] Wintemberg, 37–49, 1900, and letter of May 29, 1929.
[42] Moorehead, 141, 1922.
[43] Ibid., 112.
[44] Moorehead, 262–3, 1916.
[45] Moorehead, 143, 1922.
[46] Ibid., 133.
[47] Ibid., 149–150.
[48] 52, 1898.
[49] 76, 1914.
[50] 151, 1922.

large broad-shouldered chert arrow or spearpoints, ungrooved celts, gouges, polishing stones, scrapers, fragments of soapstone vessels, figurines and ornaments of unusual shape, and a few simple bone harpoon points.[51] The graves are shallow and empty, and the fire pits show little refuse aside from calcined bone fragments. As in Maine, Nova Scotia, and Newfoundland iron pyrites are found in these sites.[52] Parker believes that this culture appertains to the Eskimo or to a people strongly influenced by them.[53] The Eskimo-like culture is succeeded by that termed the Earliest Algonkian, which is characterized by crude implements, large clumsy spears, steatite vessels, crude clay pottery, occasionally polished stone implements, net sinkers, large flakes of stone notched at the top for choppers, and now and then a grooved ax or celt. These latter sites are usually located on high river terraces.[54] There are, according to Parker, Eskimo-like influences to be observed in this stratum and there is some blending of the two cultures.[55] It is worth noting that bone implements are relatively numerous in the Algonkian sites, walrus ivory artifacts being found along the St. Lawrence and whalebone cut on Long Island.[56] Pottery, which is lacking in the early Eskimo-like culture, is found throughout the Algonkian and Iroquoian strata. Skinner notes that certain of the oldest (lower) layers of mounds on Manhattan island are without pottery,[57] and in the rubbed points and semilunar slate knives found on Howlands island sees Eskimoan, or even older forms.[58] Thus, the detailed study of New York archaeology reveals a pre-pottery culture with certain Eskimo-like characteristics underlying the later Algonkian and Iroquoian strata. It is this older culture that bears the closest resemblance to the stone culture of northeastern Labrador.

To the west the earlier cultures are obscured by the various specialized mound-building peoples whose impressive remains have attracted more attention and presented more alluring problems. In the Ohio region the

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[51] Parker, 79, 1920; Beauchamp, 69–72, 1897, notes that slate *ulus* are most frequently found at the east end of Lake Ontario and assigns such camp sites to the Eskimo.

[52] The majority of Eskimo stone graves I examined in Labrador contained nodules of iron pyrites. This method of obtaining fire is widespread among the Eskimo. Since no burials of the old stone culture in Labrador were encountered, it is uncertain whether they used such fire-making implements although it would seem probable.

[53] 81, 1920.

[54] Ibid., 48.

[55] 81, 1920.

[56] Ibid., 76.

[57] 132, 1920.

[58] 45, 1919.

underlying culture seems to have Algonkian affinities although its persistence alongside certain of the mound cultures has so far obscured its earlier phases. Characteristic of this general Algonkian culture, according to Shetrone, are notched, stemmed and unstemmed chipped flints, grooved and ungrooved celts or axes, gorgets or tabular artifacts, pestles, grooved hammerstones, banner stones, and other problematical objects.[59] The special study of Algonkian surface finds and village sites must proceed further before the development and earlier phases of the culture become clear.

From the foregoing it can be seen that the earliest cultures yet distinguished (excepting the somewhat obscure but probably earlier Trenton Argillite culture) in the region between the Great Lakes and northeastern Labrador have many factors in common. The occurrence of polished stone gouges, chisels, ungrooved celts, stone gorgets, large chipped points, ground slate points or ground semilunar knives is common to all. Bone implements are relatively rare, but when present as in New York, Ontario, New Brunswick, Nova Scotia, and Newfoundland, the most striking artifact is a simple harpoon of bone or ivory. The problematical plummet stone is present in nearly all these cultures and it may be significant that there are two such artifacts from northeastern Labrador in the museums at Ottawa and St. Johns,[60] although I personally found none in the region. Pottery is absent from this early culture in New York, Maine, Newfoundland, and when present, as in Ontario and New Brunswick, is rather simple and not overabundant. Logically one might predicate pre-pottery horizons in the latter provinces, but if so they have not as yet been distinguished.

The occurrence of certain almost universal Eskimo traits such as the use of steatite, the woman's knife of ground stone, simple bone or ivory harpoon points, the polishing of slate points or blades, and often the presence of iron pyrites, forms one of the most uniform and striking aspects of these early horizons. This fact has led nearly all authorities to ascribe such cultures directly or indirectly to the Eskimo. That all these traits occur grouped in the earliest horizons of the northeast argues against their gradual infiltration from an outside source, while the fact that a culture containing most of the above traits, as well as heavy chipped points for hunting, and gouges and ungrooved celts for wood-working, occurs in northern Labrador apparently antedating the arrival of the true Eskimo, militates against direct Eskimo origin. This stone culture of northeastern Labrador ties up much more closely with the older Indian cultures to the south than it does with the

[59] 165–168, 1920.

[60] Personal communication from Diamond Jenness, Nov. 20, 1928.

developed Eskimo culture, and if it can be assigned to any historic people the Beothuk of Newfoundland seem the most logical candidates. These people might well have represented the last survivors of the culture driven to their island home by the later incursion of the Labrador Eskimo from the north and the Algonkian groups from the south and west. The problem is complicated by the apparently late southeastern movement of the Eskimo who occupied Labrador, for in spite of the almost universal hostility between Indian and Eskimo in historic times there must have been some cultural contacts between them. As a result, certain Indian-Eskimo correspondences due to these late contacts must be carefully separated from the older Eskimo-like characteristics mentioned above.

A wider view of native American culture shows that all the so-called Eskimo traits in these early northeastern horizons are equally characteristic of the northern Indian. Furthermore, they are in accord with a great number of other important correspondences in both the material culture and religious concepts of the two peoples.[61] This most interesting and suggestive problem is essentially one of ethnology and cannot be more than mentioned at the present time. It has, however, a direct bearing on the theory formulated by Rink[62] and amplified by Boas[63] and Steensby[64] that the Eskimo were originally an inland-dwelling group; the ancestors of the modern Eskimo having moved, or been forced to move, to the arctic coast where they developed their specialized winter culture. Recently this theory has received considerable confirmation, Jenness having demonstrated that this is exactly what has taken place among the Copper Eskimo[65] while the findings of the Fifth Thule Expedition indicate that the Caribou Eskimo, an inland-dwelling group of tribes between Chesterfield inlet and Yathkyed Lake still have a culture closely akin to that of the northern Indian and of the simplest Eskimo type.[66] The complex development of other Eskimo has evidently been due to their adoption of a specialized winter culture enabling them to live on the arctic ice. Such a life not only permits but necessitates constant travel, a fact which accounts for the wide movements

[61] Speck, 292–299, 1926, Birket-Smith, 1918, and Steensby, 172–186, 1916, deal with this subject. The culture of the Naskapi Indians reveals in addition to the recent Eskimo influences (see present author, 287, 1928), various older and seemingly more fundamental similarities,—a matter to be dealt with in a later paper on the Naskapi.

[62] 215, 1871.

[63] 355–370, 1901. 564, 570, 1907.

[64] 204–207, 1916.

[65] 540–551, 1923.

[66] Geog. Rev., 13: 625–27, 1923. Unfortunately Birket-Smith's detailed and comparative monograph on these people was not available when the above was written.

of the groups that achieved this double phase of activity. Mathiassen has pointed out a later movement from west to east of certain of these groups comprising the Thule culture, who carried the fully developed Eskimo culture from Alaska to Greenland and Labrador.[67] But of the truly primitive Eskimo horizon from which these various cultures may have developed we as yet know nothing. Considering the deeper resemblances between northern Indian and Eskimo cultures which are coming to light it seems highly significant that we have in northeastern North America a rather widespread early archaeological horizon which contains nearly all the basic elements essential to the development of both Indian and Eskimo cultures as they appeared in historic times.

The problem of Eskimo origins is still too complex for this to be more than a suggestion. On linguistic grounds Thalbitzer,[68] Sapir,[69] and Bogoras[70] favor a western or Siberian origin for the Eskimo, while recent excavations in the Bering sea region have revealed a rich and complex culture that may antedate the Thule culture in the west.[71] This culture is characterized by an ornate and curvilinear type of decoration that suggests the art of the northwestcoast Indian, although its roots may be in northeastern Asia.[72] Here again we are dealing with an advanced and complex culture, the antecedents of which will only be revealed by further excavations in Alaska and northeastern Siberia.

The final solution of the problem concerning the origin of the Eskimo must depend on a complete synthesis of archaeological, ethnological, and linguistic data. These at present are not in agreement. That in northeastern North America there exists a very early culture containing practically all the potentialities for both Eskimo and northern Indian cultural development should not be overlooked in any such study.

[67] 1927.
[68] 235–238, 1904.
[69] 82–83, 1916.
[70] 1925.
[71] Jenness, 78, 1928. Compare Mathiassen, 49–56, 1929.
[72] Jenness, 78, 1928.

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THE NEGRO IN THE NEW WORLD: THE STATEMENT OF A PROBLEM

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THE Negro in the New World has given rise to a situation which is of the utmost scientific importance, and which, in the final analysis, may have far-reaching practical significance. In affording an opportunity for study of a problem which is not only of itself worthy of consideration but which may also contribute impressively toward the understanding of some of the basic questions which confront the study of man, it deserves far greater attention than it has received, if advantage is to be taken of the peculiarly fortunate alignment of data which only await gathering to be utilized.

I

Let us restate some of the fundamental problems with which we are confronted in the study of mankind. We may group them under two principal headings,—those which arise from the consideration of Man's physical form, and those which present themselves in the study of his languages and cultures. To what extent, the physical anthropologist asks, may it be said that a given physical type holds its aboriginal form through the vicissitudes of its historical experiences? What is the effect of environment on human types? Does Man retain his different racial characteristics no matter where he may be transported? Thus, it is said that American environment is making the hair-form of Caucasians straight like that of the aboriginal Indian. Or, again, one hears that the development of pigmentation in a race is the function of the amount and intensity of sunlight to which it is exposed, and the Caucasoid Hindu is pointed to as affirming this position. Again, there are the whole group of problems which center about the question of the physical results of racial crossing. Is there a decrease of fertility with race-mixture? What is the effect on the behavior of the crossed individuals when compared with pure breeds? To what extent are the processes of Mendelian heredity that the biologist has observed in non-mammalian forms operative in Man? All of these troublesome questions await data, and data of a nature not too easily obtained. Man is a slow-breeding animal, and the life of the student appears almost hopelessly short in view of the length of time necessary to bring about the conditions to be observed.

The same is true of our linguistic and cultural problems. The student of language and of culture is himself conditioned by his own culture, and

this makes it difficult for him to obtain adequate and satisfactory data bearing on them or sometimes even to see clearly the problems he attacks. Thus, we realize the importance of knowing the extent to which cultural phenomena, like physical forms, are tenacious. We know, in a very rough sort of way, that a simple material culture will give way before a more efficient one much more quickly than one type of social organization will be given up for another. But when an aboriginal culture is vigorously suppressed, will anything remain in spite of everything? Will there be any residuum so subtle that only painstaking research will bring it to light? Again, we see that the problems of the manner in which cultures intermingle is of the utmost importance to our understanding of cultures as a whole. Yet we ask almost in vain the extent to which the differential rate of acceptability of new cultural traits makes for the harmonious combination of elements which are quite diverse in historical reality. This may perhaps be observed most satisfactorily in linguistic forms, yet on the problem as a whole we are almost completely at a loss.

More difficult than all are the problems which arise from our attempt to study the interaction between the biological form of man and his cultural behavior. As we survey a people, we are at once arrested by the questions: What of their culture is racially conditioned and what culturally? Why does the white child, when presented with a picture-puzzle, tend to put it together more quickly than the Indian but with more mistakes? Is this the result of the different cultural patterns of the social groups in which the children have been brought up, or is it caused by something inborn which will manifest itself in all aspects of their cultural behavior as they mature? We find an amazing variety of types of cultural behavior in the world, yet, if these are sketched in large enough perspective, they will seem curiously alike. Whether we observe similarities or differences, in physical form or cultural behavior, depends, in the final analysis, on the type of problem to be solved. But we all realize that differences both in race and civilization are to be found, and that if we can establish any correlation between the two, there will at least be the possibility of investigating more clearly any possible causal relationship which may exist.

II

Perhaps the fundamental difficulty in our study of these problems is the absence of control conditions. The biologist, working with the short-lived lower forms of life, can breed them in great numbers and through many generations, and thus observe the processes of heredity. He can cross various types at will, and in numbers permitting statistical analysis of his

results. Not so the student of human biology. His laboratory is the world over, and he can only at best approximate laboratory conditions. The problem is even more perplexing when we approach the study of cultural or linguistic data. At least, in the study of physical anthropology, we may take reasonably exact measurements by means of which, through statistical manipulation, we may approximate results coming from controlled laboratory experiments. At least, for the physical anthropologist, the length of the head is something directly comparable on all human beings, no matter what the racial type or the cultural background. But when we attempt to compare cultural data we come at once into difficulties arising from definition. Is a paddle in one culture really the same as that in another? Is totemism one thing, or many? In order to answer even such fundamental questions, we must know the setting of the phenomenon we are studying in the cultures of which it forms a part. And it is on the rock of disregard of the cultural associations which adhere to a given trait in different cultures that the extreme diffusionists may well come to wreck.

We must agree, then, that the only way in which problems of this sort are ever to be answered is through searching out situations in which we find the necessary controls presented to us, and studying these. Thus, in the consideration of the processes of cultural change, if we find a people of a known cultural background, who have been presented with known cultural alternatives and have accepted some and rejected others, we may obtain light on the implications of their action by studying what they have done. If, further, we find that people with the same general cultural background have been presented with different cultural opportunities, then by analyzing what they have refused and retained in each case we may make our conclusions clearer and more acceptable. The same holds true for the consideration of problems involving change in physical form. And it is because the Negro offers almost the most accessible and most easily verifiable conditions of this sort, that we may regard him as offering one of the most promising possibilities for investigation.

III

What, then, is the nature of the data obtainable from the Negro in the New World and in Africa, which will contribute to the understanding of some of our fundamental problems? Let us first consider the aspects of the situation which bear on the problems of man's physical form and the processes of racial amalgamation and change. To begin with, the unmixed Negro is found in numerous environments. In West Africa, in South America, in the West Indies, and in the United States, there are hun-

dreds of thousands of persons of unmixed Negro blood. The tropical West-African provenience of the New World Negro is not climatically different from many localities where he is found in the western hemisphere. Are any differences manifest between unmixed Negroes in the two regions? Has the pure Negro in tropical America and tropical Africa the same physical form and physiological processes? Furthermore, the Negro is not only found in the tropics, but also in the sub-tropical Bahamas and the southern United States, and in the temperate zone both in the United States and Brazil. Can it be said that he clings to his essential racial characteristics? Or has the descendant of the West African made fundamental physical adaptations to the colder climates to which he has been exposed? We cannot for a moment minimize the difficulties which lie in the path of the student who attacks these problems; the difficulty of gathering his data, and the greater difficulty of evaluating it. But it is there, both in Africa and the Americas, and needs only the patience, the time, and the workers to collect and analyze it.

Ever since the seventeenth century, the Negroes in all this region have lived in contact with whites, with extensive mixture between the races resulting, while, although to a far lesser degree, there has been contact with American Indians as well. The availability of the data for studies of race-crossing and its results is obvious. And the material is present in such quantity that the difficulty which Fischer found in his study of the Bastards of South Africa, that of small numbers available, need not be feared. The problem becomes the more enticing when we realize, also, that there are not only large differences between these races but within them as well. Africans from all portions of the West Coast and the Congo are represented in the New World, while in the United States, Brazil, and the islands and littoral of the Caribbean sea they have crossed with English, Spanish, Dutch, French, Danish, and other European types. In a word, we find all degrees of mixture between numerous types both of whites and Africans present in the region.

When we turn to the field of cultural investigation, however, we become even more impressed at the amount and kind of data the Negro offers. To begin with, the problem which is the bane of most ethnological research is not present; for as far as the Negro is concerned, we know, within reasonably precise limits that are capable of more precise definition where the New World Negroes came from. The cultural background of Africa is better understood than the physical form of the African, to our resulting advantage in this aspect of the study. On the other hand, much is known, and it should not be difficult to gather more and more cultural information con-

cerning the Negro on this side of the Atlantic. The folklore collections are impressive in their extent, linguistic studies and those of Negro dialects are beginning to be given the attention they deserve, while religious and ceremonial practices have for many years fascinated students in various portions of the Americas. With better knowledge of the African cultures we shall have an adequate basis to investigate the affiliation of those cultural traits the American Negro has retained in his contact with white and Indian civilizations. On the other hand, further investigation on this side of the Atlantic must result in more data from which to draw conclusions as to the nature of the African cultural survivals which are manifest in the behavior of the Negro in the Caribbean, the United States, and in South America.

It is quite possible on the basis of our present knowledge to make a kind of chart indicating the extent to which the descendants of Africans brought to the New World have retained Africanisms in their cultural behavior. If we consider the intensity of African cultural elements in the various regions north of Brazil (which I do not include because there are so few data on which to base judgement), we may say that after Africa itself it is the Bush Negroes of Suriname who exhibit a civilization which is the most African. As a matter of fact, unless the observer omitted to take their language into consideration, and unless he were familiar with small elements obtained from the whites with whom these people were in contact while they were in slavery and the Indians whom they drove out of the Guiana bush, he would assume, at first glance, that their culture was wholly African. Next to them, on our scale, would be placed their Negro neighbors on the coastal plains of the Guianas, who, in spite of centuries of close association with the whites, have retained an amazing amount of their aboriginal African traditions, many of which are combined in curious fashion with the traditions of the dominant group. Next on our scale we should undoubtedly place the peasants of Haiti, especially their religious life and their folklore, as they present numerous aspects which would at once be familiar to the Africanist. And associated with them, although in a lesser degree, would come the inhabitants of neighboring Santo Domingo. From this point, when we come to the islands of the British, Dutch, and(sometime) Danish West Indies, the proportion of African cultural elements drops perceptibly, but in their folklore, in such matters as the combination of aboriginal African witb their Christian religious practices, and in the curious turns of phrase to be noted in their tales, we realize that all of African culture has not by any means been lost to them. Next on our table we should place such isolated groups living in the United States as the Negroes of the Savan-

nahs of southern Georgia, or those of the Gullah islands off the Carolina coast, where African elements of culture are still more tenuous, and then the vast mass of Negroes of all degrees of racial mixture living in the South of the United States. Finally, we should come to a group where, to all intents and purposes, there is nothing of the African tradition left, and which consists of people of varying degrees of Negroid physical type, who only differ from their white neighbors in the fact that they have more pigmentation in their skins.

The importance of the mere fact that there is a racial type for which such a list can be made is enormous. To what extent are cultural elements which are constant in all this varied list to be discerned? What do the Africans do that the inhabitants of the Negro quarter of New York City also do? May we find perhaps, on close examination that there are some subtle elements left of what was ancestrally possessed? May not the remnant, if present, consist of some slight intonation, some quirk of pronunciation, some temperamental predisposition? And if we do find these, may we ascertain the extent to which they are increasingly present as we find Negroes removed from white influence? That such factors are to be discovered is quite possible, and this fact is something to be reckoned with in all studies of the Negro. And the important part of the matter is that the discovery of any constants will throw as much light on the behavior of the African as it will on that of the New World Negro. For in the final analysis, and in the nature of the case, the most illuminating method of studying the presence of cultures is by considering conditions in which culture has maintained itself under stress and strain. What is retained and what discarded will point our way to understanding what is found in Africa, as it may well make for a greater understanding of the processes of culture as a whole. Certainly if we find that whatever has been retained by the Negroes in all these varying cultural adventures is constant throughout all the groups, we shall at least have a lead as to what to look for when we attempt to unravel situations arising out of an unknown historical past. And this is the sort of problem that presents itself to the anthropologist as the rule and not as the exception.

Data of this kind should also point toward an understanding of the nature of the interrelation of physical form and culture, as merely a cursory consideration of the Negro in his cultural wanderings is conducive to thought on the matter. That the problem is a very practical one is patent to one reading the literature of the Negro in the United States. Almost everything that he does has been attributed to innate qualities. Yet if in our survey of all these cultures we find some elements always the same,

while others vary with differences in historical background and cultural contacts, the problem will be restricted by that much, and we can then go on from that point in our attempt to determine whether these results have been determined biologically or culturally. Has the Negro, for example, a definite temperament? Is he always happy? What is it that makes him like to sing and to dance? Is he, by and large, to be regarded as extraverted wherever found? A Negro economist who is making a study of Negro business activities in the United States finds himself puzzled by just this sort of problem. "Why is it," he asked me, "that Negroes living in a civilization essentially pecuniary turn to poetry, music, and painting rather than to business as soon as they have acquired a social surplus?" And that this question is not an idle one is apparent to those who are conversant with the development of the so-called "New Negro" movement in the United States, which has attracted so many of the younger Negroes.

There is the matter of folklore. How stable is the folklore of the Negro? We know that Negro tales are affected by the cultural contacts of their tellers; that the Dutch Negroes have Dutch elements in their stories, the French ones French elements. But aside from this, what common elements, African and not European, are to be discerned in all of them? Are the "voodoo" of the southern United States, the dances of Haiti, the winti of Dutch Guiana all manifestations of the biological make-up of the Negro which is to be seen in the pure form in the dances and other religious rites of the Africans and in attenuated form in the hysteria shown in the "revivals" of the Christian Negro churches from time to time in the United States? Or are these latter cultural carry-overs? Why does the Negro in Dutch Guiana use "tjari kɔ' " for the expression "to bring," and why do we find exactly the same expression in the folktales of the comparatively Europeanized Negroes of Jamaica? Why has the Twi day-name Kofi (Cuffee) persisted in the United States in spite of the rigorous manner in which the African elements of culture have been weeded out?

What of Negro music? It has been claimed by Professor von Hornbostel that the spirituals of the United States are essentially European folksongs created by the innate musical genius of the African, and that only the motor behavior which biologically determines the manner in which they are sung is African. But would this type of motor behavior persist in crossing? For the appearance of the mixed Negroes and the pure ones when singing these songs is quite the same. Or shall we find that there are gradations of intensity of African stylization in the music of these peoples to correspond with the degree of intensity of African elements in the general culture? In all these problems, the question comes up: What is innate and what cul-

tural? Investigation into the manner in which the Negro has accommodated himself to all the different cultural backgrounds into which he was brought as a slave should constitute a significant step toward an understanding of the interrelation of the processes of culture and physical form.

So much for the problem and opportunities for gathering data contributing to its solution. That the Negro in the New World offers a wide and profitable field for study, which should result in findings of the utmost importance for Africanists, Americanists, and those who are interested in the larger aspects of human existence, should be apparent. We must consider the kind of information needed for an understanding and solution of the problem presented by the Negro.

IV

In the consideration of physical form, the problem must be first attacked in Africa itself. Until we know more of the essential nature of the people and cultures of the region from which the New World Negro was brought, studies made on this side of the Atlantic can have little general significance. What distinct tribal differences are found in West Africa and the Congo? What is the variation of pigmentation in the native African? What is the range of nostril width? Of lip thickness? What are the differences to be found in facial form, in bodily proportions, in functional processes? The measurements of families, especially adults of both sexes and of children of both sexes and all ages, are badly needed. How does the African child grow? In what manner are African physical characteristics inherited? All of these points need elucidation, for we have had too much measuring of cephalic index on a miscellaneous group of Africans, and not enough systematic study of other traits in related descent lines. In the case of the American Negro, having the necessary comparative data, we may do two things. In the first place, we may point with greater certainty to the African provenience of certain isolated New World groups. And for studies of racial crossing and its effects, we can have the greater certainty as to the nature of the basic stocks from which this African portion of the ancestry of the mixed American Negroes came, which we have for the other, the European portion.

Another aspect of the attack on the problem is the cultural one. Any serious contribution to this phase must also be based on far greater knowledge of African cultural processes than we possess at present. This is especially true of linguistic material. Thus, we know almost nothing about the significance of tone in the vast majority of West African and Congo languages. We know almost as little about their basic phonetic elements, thus it is here that we may find the most subtle survivals. Both in Haiti and in

Suriname we find that the double closure (gb) is employed in certain terms, while it is reasonable to suppose, on the basis of present knowledge, that the tendency toward tonal inflection which characterizes many languages of West Africa is one of the most tenacious elements in the New World Negro's culture. That there is tone, no longer significant but none the less present, few who have heard the American Negro talk under stress can doubt. Much more definite information as to its rôle both in Africa and here is essential before we can draw conclusions of any validity. Furthermore, such a matter as the use of the falsetto to express surprise, so characteristic to the Negroes of the New World wherever they are found, is one concerning which no Africanist has enlightened us; perhaps because it has not been realized that it was a point of importance. But if we can establish such unconscious behavior patterns as present among Negroes wherever they may be found, will it not be of significance when fitted in with other data?

Religion, folklore, social organization will all repay the most careful study. And not only the reports of these cultural manifestations themselves, but the consideration of the attitudes of the people are needed. Why did the Negro acquiesce in slavery itself as complacently as he seems to have done? Was it something essential in his make-up, or was it because the only cultural fact that was familiar to him in the civilization of the Americas was that of slavery? What is the significance of the great family solidarity of the Negroes, something noted by all who have had contact with them? It is not strange that we find a form of social organization in Suriname, that is almost typical of West Africa, but why in the United States is there such great objection among Negroes to allow their children to be cared for in institutions? Why is it that families, themselves almost on the poverty line, will take under their wing a homeless child rather than give him to strangers? What is the relation of the phenomena of religious hysteria so familiar to students of the Negro in the United States, Haiti, the Guianas and the West Indies to similar African phenomena? And to what extent is the folklore of the Western Negroes today, to what extent has it been deflected by the culture of the whites? Until we know more of African folk-material we cannot adequately answer these questions.

On the other hand, this is not to say that were African physical types and cultures much better known than they are, sufficient information would be available regarding the Negroes of this side of the Atlantic to make important progress with the problem. The first line of attack is one essentially historical, and a matter for the trained archivist. Where did the slaves brought to the New World come from? It is not enough to know that they represent tribes from Sierra Leone to San Paõ de Loando. It

would be strange were no tribal names found tucked away in the records of the slavers; if a careful investigation into the problem of the places where shipment was made from Africa did not at least reveal the towns on which slave caravans converged from the interior. In the records of the ports of the southern United States and the West Indies, of Suriname and Brazil; in the archives of Lisbon and Rotterdam and Gothenburg and Gloucester and Liverpool and other shipping centers of the 17th and 18th centuries, it is fairly certain that careful search will reward us with a flood of light as to the exact provenience of the Negroes. We know that "Coromantynes" were brought to the New World, but who were these people? Ashanti, perhaps, but we cannot be sure. And although the names of some tribes are known to us, this, again, is not enough, and even the scattered references to these have not been collected and made available to us.

Data on the physical anthropology of the Negroes of the western hemisphere is also sadly lacking. Up to five years ago, nothing had been done to study the Negroes of the United States, and today relatively little is known of their physical form. Of the West Indians we know less, while of the Negroes of central America and northern South America we know practically nothing. And the culture and physical form of Brazilian Negroes are *terra incognita*. Studies of pure-blood and mized Negroes in all these regions are badly wanted, and, although progress has been made in the United States, almost all the questions which were posed for the Africanist working in physical anthropology might also be posed for the student of the Negro in the New World. Work in this hemisphere takes on added importance, since measurements on some of the islands of the West Indies, and in Brazil, where there has not been the insistence on the color-line which has characterized other islands and the United States, should reveal the influence which prejudice, a cultural fact, has had in forming the physical types to be found.

In the realm of culture, only in folklore has work been carried on to an extent to be of use to us, and even here there are far more data to be collected. What of the lore of the Negroes in the Spanish-speaking countries of Central America? We know nothing of it, and practically the same is to be said of Brazil and many of the West Indian islands. In linguistics, studies of variations of dialect in the European languages spoken by the New World Negroes are practically non-existent, nor has any notice been taken of the manner in which the tonal survival to be noticed is employed. Yet the scientific importance of such studies, especially if carried on by one familiar with African linguistics, should be of the first order. No systematic study of

the religious practices of the Negroes of the United States from the point of view of the ethnologist has been carried on to my knowledge. Yet survivals of African religious practices offer a fertile field for study. We have many collections of Negro spirituals, but the extent to which they are similar or different from the songs of the Africans and the West Indians and South American Negroes is unknown. Indeed, the point becomes striking when it is realized that a book review by Professor von Hornbostel, perhaps the only man conversant both with African music and the spirituals, threw more light on the problem of the rise of American Negro music and on the cultural processes involved, than any of the lengthier works dealing with the music of the Negroes where his comparative knowledge was lacking. Certainly it is in folklore, religion, and music that much of the attack must be centered. For it is principally here, certainly as far as the Negroes of the United states and most of the West Indies are concerned, that possible African cultural survivals are to be salvaged.

The problem is not a small one. But that it is of great significance for the study of man's physical form and culture, and particularly for an understanding of the Negro both in Africa and America, cannot be doubted. And if we realize that it deserves far more attention than it has received, and that it must be perceived and approached by many workers on a vast scale, we shall have made the first step toward its solution.

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SOME NEGLECTED DATA BEARING ON CHEYENNE, CHIPPEWA, AND DAKOTA HISTORY

By JOHN R. SWANTON

WHILE I do not wish to minimize the historical value of tradition when it is carefully handled, we have frequent illustrations of the extent to which uncritical reliance on it may lead astray. A case in point is the circumstances surrounding the destruction of the old Cheyenne town on Sheyenne river, North Dakota, and the time when it took place. Mooney, relying on traditions reported by Williamson, supposed that the attackers were Dakota and so expressed himself both in his paper on The Cheyenne Indians in the *Memoirs of the American Anthropological Association* (Vol. I, Pt. 6) and the article on that tribe in the *Handbook of American Indians* (Bull. 30, Bur. Am. Ethn.). Will, in an article on The Cheyenne Indians in North Dakota (*Proceedings of the Mississippi Valley Historical Association*, 7; 67–78), rejects this view in favor of a Cheyenne tradition in which the hostile party is represented as Assiniboin, and Grinnell in his elaborate work on *The Cheyenne Indians, their History and Way of Life*, (New Haven, 1923), follows him as to his general conclusion. Speaking of the retirement of the Cheyenne southward, he says:

> I believe that the Cheyenne tradition of their being driven south refers to early attacks on them by the Assiniboines, perhaps in company at first with the Crees and later with the Ojibwa. That there may have been occasional individual quarrels between Cheyennes and Sioux and between Cheyennes and Mandans is possible and even likely, but I believe nothing in the nature of a general war (p. 23).

These writers discuss the whole matter at considerable length evidently wholly ignorant of the fact that there is a circumstantial account of the capture of this fort by the chief who led the attack and a French Canadian employee of the North West Company who seems to have been directly cognizant of the whole affair. In brief, the Cheyenne town was not destroyed by the Dakota, nor yet by the Assiniboin or Cree, but by a body of Chippewa Indians led by Sheshepaskut, head chief of those bands of Chippewa which were forcing their way southwest at the end of the eighteenth century. The French Canadian was Jean Baptiste Cadotte the younger, who, in 1799, was in charge of a post of the North West Company on the banks of Red Lake River, where the Clearwater joins it, a site now occupied by the town of Red Lake Falls, Minnesota. The account itself is in David

Thompson's *Narrative of his Explorations in Western America, 1784–1812*, of which a splendidly edited and executed edition was published by the Champlain Society in 1916. As this is readily available, there should be no further excuse for ignorance on this particular point and the work in general is one that no student of the Northern Plains and Upper Missouri Valley tribes can afford to neglect. Thompson was an employee of the Hudson's Bay and North West companies between the years 1784 and 1807, and a partner in the latter from 1807 to 1812.

On March 25, 1799, this adventurer arrived at Cadotte's post. On the 27th he set out again along Red Lake river and at two in the afternoon of that same day

> came to seven Tents of Chippeways and to Sheshepaskut (Sugar) the principal Chief of the Chippeway Tribe; he appeared to be about sixty years of age, and yet had the activity and animated countenance of forty. His height was five feet, ten inches. His features round and regular, and his kind behaviour to all around him, and to strangers, concealed the stern, persevering Warrior, under whose conduct the incursions of the Sioux Indians were repressed, and the Village Indians driven to the Missisourie (p. 253).

Thompson started on again next day but continuous thaws forced him to return to Cadotte's house to wait for the river to clear of ice so that he could proceed by canoe, and he was there from March 31 to April 9. One day, during this enforced period of idleness, he says:[1]

> The Chief, Sheshepaskut, with a few men arrived, with a few Beaver Skins and Provisions; I enquired of him, the cause of his making war on the Chyenne Indians and destroying their Village, and the following is the substance of our conversation. Our people and the Chyenne's for several years had been doubtful friends; but as they had Corn and other Vegetables, which we had not and of which we were fond, and traded with them, we passed over and forgot, many things we did not like; until lately; when we missed our Men who went hunting, we always said, they have fallen by the hands of our enemies the Sieux Indians. But of late years we became persuaded the Chyennes were the people, as some missing went to hunt where the Sieux never came; We were at a loss what to do; when some of our people went to trade Corn, and while there, saw a Chyenne Hunter bring in a fresh Scalp, which they knew, they said nothing, but came directly to me. A Council was called, at which all the Men who had never returned from hunting were spoken of by their relations; and it was determined the Chyenne Village must be destroyed: As the Geese were now leaving us, and Winter [was] at hand, we defered to make war on them until the next Summer; and in the meantime we sent word to all the men of our tribe to be ready and meet us here when the berries are in flower. Thus the

[1] Thompson's own orthography and punctuation are preserved.

winter passed; and at the time appointed we counted about one hundred and fifty men. We required two hundred, but some of the best hunters could not come, as they had to hunt and fish for the families of the warriors that came. We made our War Tent, and our Medicine Men slept in it; their Dreams forbid us to attack them until the Bulls were fat; the Chyenne's would then leave their Village weak to hunt and make provisions. To which we agreed.

The time soon came, and we marched from one piece of Woods to another, mostly in the night until we came to the last great Grove that was near to the Village. Our Scouts were six young men. Two of them went to a small Grove near the Village, and climbing up the tallest oaks, saw all that passed in the Village and were relieved every morning and evening by other two.

We thus passed six days, our provisions were nearly done, and we did not dare to hunt. Some of our men dreamed we were discovered and left us. On the seventh morning, as we were in council, one of the young men who were on the watch came to us, and gave us notice that the Chyennes had collected their Horses and brought them to the Village. We immediately got ourselves ready and waited for the other young man who was on the Watch; it was near mid day when he came and informed us that a great many men and women had gone off hunting, and very few remained in the Village. We now marched leisurely to the small Grove of Oaks to give the hunting party time to proceed so far as to be beyond the sound of our Guns. At this Grove we ought to have remained all night and attack the next morning; but our Provisions were done, and if they found the Bisons near; part of them might return; From the Grove to the Village was about a mile of open plain; as we ran over, we were perceived, there were several Horses in the Village on which the young people got, and rode off.

We entered the Village and put everyone to death, except three Women; after taking every thing we wanted, we quickly set fire to the Village and with all haste retreated for those that fled at our attack would soon bring back the whole party, and we did not wish to encounter Cavalry in the Plains.

Here the old Chief lighted his pipe, and smoked in a thoughtful manner. Mr. Cadotte then took up the narrative. Those left in charge of the village were twelve Men of a certain age, and as there was not time to scalp them in the manner they wished, their heads were cut off, put into bags; with which, and the prisoners, they marched through the Woods to the camp near the Rainy River. Here they recounted their exploits, and prepared for a grand war dance the next day: which accordingly took place. One of the three Women prisoners was a fine steady looking woman with an infant in her arms of eight months, which they in vain tried to take from her. Each time she folded it in her arms with desperate energy, and they allowed her to keep it.

The war circle being made by the Men, their Wives and Children standing behind them, the three prisoners were placed within the war circle; the heads taken were rolled out of the bags on the ground: and preparatory to their being scalped, the whole circle of Men, Women, and Children with tambours rattles and flutes, shouted the War whoop, and danced to the song of Victory. The prisoner Woman

with her infant in her arms did not dance, but gently moved away to where the head of her husband was lying, and catching it up, kissed it and placed it to the lips of her infant; it was taken from her and thrown on the ground; a second time she seized it, and did the same; it was again taken from her, and thrown on the ground; a third time she pressed the head of her husband to her heart, to the lips of herself and child; it was taken from her with menace of death: holding up her infant to heaven, she drew a sharp pointed Knife from her bosom, plunged it into her heart; and fell dead on the head of her husband. They buried her, and her infant was taken to, and brought up at, the Rainy River House.

The old Chief still smoking his pipe, said the Great Spirit had made her a Woman, but had given her the heart of a Man. (pp. 261–3)

The last section may be recommended to the consideration of those readers who still suppose romantic attachment between individuals of opposite sexes among primitive people was unknown.

Unfortunately the above material does not enable us to date the principal event exactly but this can probably be done if the date of occupancy of Rainy River House is determined. It hardly seems possible to place it much before 1790, and this throws out most previous estimates. It is probable, however, that other bodies of Cheyenne had advanced already as far as the Missouri.

Just beyond the sections quoted is very important information bearing on the relations between the Chippewa and Dakota during the westward migration of the two and here we gain some insight into the technique of Woodlands and Plains fighting.

Our discourse then turned on the Sixty Seven souls, Men, Women and Children that two springs ago [i.e., in 1797] were destroyed by the Sieux Indians at the Sand Lake of the Mississippe [the present Sandy Lake in Aitkin County] where they were making Sugar; the Chief replied that he did not know what to say to it; it was a bad affair and they longed to revenge it: but they in a manner brought it on themselves. For several years there had been no regular war between us, they had left the Woods, made very little use of Canoes, and having many Horses were living in the Plains and had we waited, would have left the whole of the Woods to us. The Sand Lake was finely wooded with large Maples, which had never been tapped; this tempted our people, they went and made a great deal of Sugar; this did for once, and the Sieux took no notice of it; but when they returned the next spring, this was making that Lake their own, the Sieux did not care for it, but would not allow it to be taken from them. They formed a war party and so completely surprised our people that not one escaped, and the enmity that was dying away between us is now as bad as ever. While they keep the Plains with their Horses we are not a match for them; for we being foot men, they could get to windward of us, and set fire to the grass; When we marched for the Woods, they would be there before us, dis-

mount, and under cover fire on us. Until we have Horses like them, we must keep to the Woods, and leave the plains to them. (pp. 263–264)

It would seem from this that the Dakota did not make as much use of maple sugar as the Chippewa. It also proves that the westward movement of the former tribe was the result of attractive as well as repulsive forces, the acquirement of horses and fascination of bison hunting no less than the pressure of the Chippewa and their fuller equipment with firearms. With all that, as late as 1797 we find them still claiming a territory as far east as Sandy Lake and punishing intruders upon it. On May 6, 1799, Thompson himself reached Sandy Lake (called by him "Sand Lake") and found it held by the Chippewa, but

the Men were hunting on what is called the War Grounds, that is, the debatable lands between them and the Sieux Indians,

and these do not seem to have been far off, for it may be assumed, from what the Chippewa chief had said, that his people would not be likely to venture out of the woodlands.

It is unfortunate that Thompson does not say what division of Dakota claimed Sandy Lake, but I gain the impression that it was not a part of the Santee. From what Hennepin and others tell us it seems to the writer that the Dakota bands afterwards known as Yankton and Teton originally lived north, or slightly northwest of the others, that the Chippewa attacks came from north and northeast, and that while the Santee who were driven from Mille Lacs retired south upon the Mississippi, the Yankton, Teton, and their allies moved directly west. On one of Thompson's maps the southern head of Red river is called "Sieoux River," and it still bears the name Bois de Sioux. To this the Dakota in the region in question probably retired. It would seem doubtful whether their settlements extended as far as the Missouri much before the time of which we are speaking, which means that their westward extension has been very modern.[2]

Finally, it is evident that a careful historical study of the territory embraced in what is now central Minnesota would considerably illuminate our knowledge of the northern Plains tribes. It is evident that many of them took their departure into the Plains from this neighborhood.

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[2] Unless, indeed, the *Gens de l'Arc* encountered by Vérendrye in 1742 belonged to this tribe, but the fact has yet to be demonstrated.

BOOK REVIEWS

PRINCIPLES AND METHODS

Are We Civilized? Human Culture in Perspective. ROBERT H. LOWIE. New York; Harcourt, Brace and Co., 1929. 306 pp. ($3.00).

In this painfully progressive age when most anthropological questions are decided by the newspapers, when almost anyone who has dug up somewhere a skull or a few bones proclaims in the press a new "early man," when so many who stumble in the soil over a handful of pottery sherds proudly announce *urbi et orbi* the discovery of a new culture type, it is a veritable relief and pleasure to peruse a book such as Dr. Lowie has presented us. Not that there is a lack of popular books on anthropological subjects. There are a few serious ones, but, as in other sciences, we have also had our share of cabaret entertainers, vaudeville performers, rope dancers, and saxophone jazz players. Dr. Lowie's book differs advantageously from the present average wholesale manufacture of printed material designed for the uplifting of the masses. It is at once the production of mature scholarship coupled with wide reading and keen thinking, and more than that—it is the book of a man of culture and a philosopher who has seen and observed much of life and who has his own ideas about men, things, and events. Besides, he is an eminent teacher, and he is amply endowed with that faculty which makes the real scholar, but which is growing rarer and rarer among modern scholars—the faculty of thinking objectively, without bias, without newspaper and mob psychology.

After some introductory chapters on culture, geography and heredity, Dr. Lowie discusses food, food etiquette, fire and cooking, domestic animals and cultivated plants, housing, dress and fashion, crafts and industries, travel and transportation, sex and marriage, family, clan and state, prestige and etiquette, education, writing, art, religion, hygiene and medicine, science, and progress.

The veterans in the profession will naturally meet with many old acquaintances in these pages, and it is not so much novelty of facts or boldness of speculation that characterize the book. It is rather the ingenious way in which well sifted facts or the latest results of research are skillfully utilized, arrayed and combined to drive home a certain point or to open the reader's eyes. Dr. Lowie's main object is to demonstrate how slow the progress of civilization has been, how closely allied we still are with primitive man and that the difference between savagery and civilization is merely one of degrees, not of principle. As an introduction into modern anthropological thought, as a guide into the workshop of a clear-minded and honest thinker, this book is excellent and is bound to fulfill a mission. I hope that it will find many readers both among students and laymen, and that they will enjoy the book as much as I did. It will doubtless act as a catharsis of the mind, purge many a soul, dispel doubts and prejudices, lead to a juster appreciation and evaluation of

cultural achievements, and stimulate many to independent thinking. This book is entertaining on every page; it is written in a pleasant, vivid and poignant style often blended with a dose of wit or sound sarcasm. Dr. Lowie is never dull or pedantic, and his diction is felicitously free from the current anthropological jargon as "phenomena, material culture, diffusion, divergence," etc. Another refreshing feature of the book is that its author is not merely an American anthropologist in the commonly accepted narrow sense, i.e., one whose horizon is limited by the Indians and Eskimos of North America; he is equally familiar with Africa and the South Sea islands, he is even at home in China and Siberia, and displays an unusual insight into the mental development of European society. In other words, the subject is treated from a universal culture-historical standpoint, and this is exactly what makes the book alive, attractive, and colorful.

It contains a goodly number of clever aperçus or pointed paragraphs which are worth memorizing. Here is one of them:

> Men get intoxicated with their theories and are willing to die for them. It is a pity, though, that they want others, too, to die for them.

I must confess that I am in a state of mind where I would no longer give a dime to any one for a new theory, but I am always enthusiastic about new facts, data, and thoughts.

A pleasing point in the make-up of the volume is the absence of the tiresome and meaningless halftones by which the majority of popular works are disfigured and needlessly increased in price. The thirty-eight pen and ink drawings scattered over the pages of this volume are well chosen, to the point, and instructive.

As this book will surely run through several editions, I submit a few remarks bearing on details for the author's consideration in the next edition.

Dr. Lowie (pp. 247, 260) subscribes to the idea that we got quinine from the American Indians. This seems to be a favorite dogma of American anthropologists. In Wissler's *The American Indian* (p. 20) the genus Cinchona even parades among "plants cultivated by the natives of the New World before 1492." No species of Cinchona, of course, has ever been cultivated in America, and the notion that the Indians had any knowledge of the medicinal properties of the bark hangs on very slender threads. The celebrated Sir George King opens his *Manual on Cinchona Cultivation* as follows:

> Of the date and manner of the first discovery of the curative effects of cinchona bark in malarious fevers we know nothing. And we are almost equally ignorant of who the discoverers were, some writers claiming that merit for the aborigines of South America, while others assert, and with apparently greater accuracy, that not only did the Indians know nothing of the virtues of the bark, until these were pointed out by their conquerors, the Spaniards, but that they still refuse to use the bark as a febrifuge.

C. R. Markham, in his excellent book *Peruvian Bark* (London, 1880), likewise points out that the aborigines of South America appear, except perhaps in one locality, to have been ignorant of the virtues of Peruvian bark. This locality is in the neighborhood of Loxa, 230 miles south of Quito, where the use of the bark is alleged

to have first been made known to Europeans by the Indians of Malacotas. This statement, however, emanates solely from the French botanist Joseph de Jussieu who examined the cinchona trees of Loxa in 1739. There is no other evidence for aboriginal use of the bark. None of the early Spanish chroniclers of Peru refers to it. The indifference to and in many cases even prejudice against the use of Peruvian bark among the Indians, according to Markham, is very remarkable. Poeppig, in 1830, observed that in the province of Huanuco, Peru, the people, who are much subject to tertian agues, have a strong repugnance to its use. Humboldt also noticed this aversion to using the bark among the natives; and Dr. Spruce made the same observation with respect to the people of Ecuador and Colombia, explaining that they refer all diseases to the influence of either heat or cold and suppose all fevers to proceed from heat. They justly believe bark to be very heating, and hence their prejudice against its use in fevers which they treat with cooling drinks. For these reasons it is most improbable that the discovery of the febrifuge properties of the bark is due to Indians.

The home of the pineapple is in Brazil, not in the Antilles, as stated on p. 62 (see *Science Monthly*, 248, 1929).

In the chapter "Food Etiquette" reference should be made to the invention and use of chopsticks by the Chinese and the other nations who came under the spell of Chinese civilization, and good table-manners in consequence of their use (cf. my remarks in *Ivory in China*, p. 67). Even small inventions may have a large bearing on the development of manners and institutions.

The mariner's compass was assuredly invented by the Chinese, but the so-called south-pointing chariot must be discarded as a figment (p. 115).

Human traction still lingers on. In the Far East there are the rickshaw and the sedan chair (p. 117).

The statement itself is correct, but no one endowed with historical sense should name the riksha and the sedan chair in one and the same breath. The former is quite a recent invention made by an American or Japanese (the authorship is controversial) and has followed the European to all treaty ports of China and Japan; there is nothing "native" about it, and it is absurd to choose as a museum exhibit as is done e.g. in the Grassi Museum of Leipzig, a Japanese woman seated in a riksha. The sedan chair, on the contrary, is a very ancient institution all over the East.

It was the Hindus who developed our system of *numerals* and the Arabs who brought it into Europe during the middle ages (p. 267).

"Numerals" is the wrong word; what is meant here is, of course, the digits.

The suggestion that the Chinese may have received a vague impulse toward writing from Babylonia (p. 182) does not evoke an echo in my breast. An hypothesis is only permissible if it is able to explain satisfactorily at least some aspects of a problem; but if an hypothesis explains nothing at all, as it does in this case, it has no raison d'être and is superfluous. The combination of "woman" and "child"

in a Chinese character does not express the Chinese concept of happiness, as stated on p. 185. This character, read *hao* in the third tone, means "good, right, kind, dear;" read *hao* in the fourth tone, it means "to like, to love, to be pleased." The conclusion that "the history of writing is a grimly sardonic commentary on man's stupidity" may be partially correct; in its generalization it is somewhat unfair. In my estimation Chinese writing is one of the most ingenious systems ever conceived by the human mind.

The chapter on writing should contain at least a brief reference to paper, ink, and printing. We miss a chapter on barter and commerce, trade routes and navigation, currency and money.

It is correct that cast iron was unknown among the ancients and in medieval Europe (p. 90), but it is certainly older than the fifteenth century. The Chinese were masters in the casting of iron as early at least as the beginning of our era (Han period), and many fine specimens of this early art are on exhibition in Field Museum (for illustration and description of some of these see Laufer, *Beginnings of Porcelain*, plate II, and *Chinese Clay Figures*, plate XXI). The Chinese applied to iron the same casting methods with which they had previously treated bronze. What they learned from outsiders was a particular method of forging iron as practised by the people of Kucha, an Iranian nation in Turkestan (not from Turkish nomads to the north, as said on p. 89). It is a very remarkable fact that the Chinese have always been, and still are, experts at casting iron (their cast-iron temple-bells, for instance, are technical masterpieces with which other nations have nothing to compare), but that their knives and swords of wrought iron are poor productions, certainly much poorer than any African and Malayan ones.

Perhaps the best and most interesting chapter of the book is the last, devoted to science, and with this outline I am fully in accord. I almost feel like saying that it is with regret that I plainly agree with the author's remarks on the attitude of scientists during the World War. He compares the attitude of scientists of 1918 with those in 1813 when men of learning had not yet been debauched by chauvinism. But there remains another point to be considered. From the sixteenth to the eighteenth century European scholars all conversed and wrote in one common language—Latin, and they formed a small exclusive minority, a veritable aristocracy of the intellect. In our days science is something different, it has settled down to a business, and maintains and commands workers by the thousands. Science is now democratized, organized, standardized, militarized, commercialized. The old noble, unselfish, aristocratic spirit is gone forever. There are a few leaders followed by immense armies, and in addition to the regulars there is also a learned mob and the great mud-slinging scientific(?) proletariat bursting with jealousies, so characteristic of Germany, but perhaps no less of other lands too. Dr. Lowie summarizes the history of science as follows:

> In the accumulation of knowledge there has been great progress. In the psychology of the scientific observer there has been no fundamental change since the Reindeer Age. In point of scientific ethics the last hundred years mark a period of retrogression.

Unfortunately, this latter observation is only too true.

The main question raised by this stimulating book, Are we civilized? may be plainly answered, "We have evolved with much pain some sort of a civilization, but we are still far from being civilized and humanized." Leaving aside our undeniably vast progress in technical matters and comfort of living in consequence of it, our civilization is less characterized by what we do than by what we do not. We no longer offer human sacrifices or burn witches at the stake or demand from a widow that she follow voluntarily her husband into the grave; but we have more civilized substitutes: we cheerfully sacrifice thousands of lives every year to the Moloch of speed and kill as many in railroad and factory accidents, we still have the revenge of the law, capital punishment (not to speak of lynchings) and a cruel prison system. I hope that in the next edition of his book Dr. Lowie will ventilate the question, Why are prisons? Why are prisons a creation of European-American civilization? Why could primitive man and the civilized Oriental nations get along without them?

Another chapter that might profitably be added to this book should deal with primitive survivals and fake cults in our own midst. The *Chicago Tribune*, after a careful inquiry into the subject, once computed that fortune-tellers, clairvoyants and such like folks in the city of Chicago reap more than half a million dollars annually, not, as one might rashly suppose, from dupes, feeble-minded or lowbrows, but from society women alone. The advertisements in our Sunday papers furnish any amount of instructive data testifying to prevalent beliefs in magic, astrology, horoscopes, chiromancy, dreams, incarnations, cults, etc.

Finally I wish to add to the "Hints for further reading" an old book which I find few of our colleagues have read—*The Martyrdom of Man* by Winwood Reade, first published in England in 1872 and perpetuated through twenty-four editions. A new American edition was published by E. P. Dutton Company in 1926. This remarkable book may well be designated in a way as a forerunner or avatar of Lowie's.

BERTHOLD LAUFER

In the Beginning; the Origin of Civilization. G. ELLIOT SMITH. (New York: William Morrow & Co., 1928. 86 pp. $1.00.)

Gods and Men; the Attainment of Immortality. W. J. PERRY. (London: Gerald Howe, Ltd., 1927. 87 pp. 2s. 6d.)

These two little volumes appear in the series "The Beginning of Things," edited by Professor G. Elliot Smith and published, respectively, by Gerald Howe in England and William Morrow in the United States. Both booklets give a lucid presentation of the views of culture entertained by the leaders of the British Diffusionist school and therefore merit careful perusal. The strong points in the authors' position are clear. They are free from biological dogmatism: instead of interpreting social behavior exclusively in terms of heredity, they concede as much importance to the social environment as any sane student could wish (Elliot

Smith, 14, 19). They attempt to see culture as one connected whole and trace connections over the entire globe. They stress the part played by degeneration in human history, and they give due weight to the difficulty of technological invention.

In short, several of their cardinal principles, when stated in abstract form, are impeccable. Unfortunately they are entangled with others of doubtful quality; and they are applied without constant attention to ethnographic and chronological considerations, and indeed with disregard of their consistency with one another.

Perhaps the clearest illustration of all these weaknesses is provided by the conception our authors entertain of man in the days before farming. According to Professor Elliot Smith, this Natural Man lived "much in the same way as the apes do," without houses and clothes, "having neither arts nor crafts beyond the making of implements of the chase" (p. 31),—a statement, by the way, not readily reconciled with his "aptitude for pictorial art and craftsmanship" (p. 21).

> He has neither religion nor social organization, neither hereditary chiefs nor any formal laws or ceremonies, either of marriage or for the disposal of the dead (p. 22).

This is supposed to have been the condition of all mankind until about 4,000 B. C. and to be still the condition of such mere food-gatherers as the Pygmies, the Vedda, the Eskimo, the Lapps, the Dene, the Salish, the Nevada Indians, and the Tierra del Fuegians, all of whom are credited with a "surprising uniformity" of custom. This assertion is, of course, untenable. The reindeer-breeding and butter-churning Lapps are not food-gatherers at all; and the well-clad seal-hunting Eskimo differ considerably from the shivering Fuegians or the root-digging Shoshoneans of the Basin. Going back to first principles, material inventions *are* difficult, but they are not impossible, as all adjustments to purely local conditions prove. The Arctic peoples of Eurasia and America certainly were not going about naked before the blessings of Egyptian civilization reached them, and at what period of Egyptian history were skis and snow-goggles in vogue?

According to both our authors, the American natives began to obtain their cultural capital about 2,000 years ago (Elliot Smith, 83), though the pyramids of Middle America were not erected until about six centuries later, so that the vitalizing impulses from there northwards presumably date back only to about 600 A.D. Indeed, we are told (Perry, 19) that

> The tribes of the United States cannot have practiced agriculture for many centuries.

Naturally, we wonder how long that is supposed to be. Two things, at least, would have to be accounted for,—the specialization of farming techniques and the different varieties of maize. Can we suppose that the Hopi learnt to dry-farm overnight or that the Hidatsa, hitherto almost apelike, suddenly evolved a method of getting crops in North Dakota? Again, how are we to explain the domestication of the llama and the alpaca? It takes time to get animals to breed freely in captivity, and who taught the Peruvians? What would have suggested the idea of breeding guanacos to the Polynesians, who at best had only the chicken and the pig?

The whole conception of diffusion as proceeding from one single source is fallacious; and the assumption (Perry, 18) that because North American aborigines owe maize to Middle America they also owe everything else to the same source is not valid. Europeans also owe maize to Mexico, but they derived neither ironwork nor steamships nor Christianity from that source. Mr. Perry concedes in a recent article that the cart wheel is earlier in Babylonia than in Egypt and was diffused to the Nile from there. The Chinese borrowed navigation from the Malays, felting and cavalry tactics from nomadic neighbors, glass from the West; and they have given us rag-paper, tea, and porcelain. Where, in the historically known cases, is there not rather an interchange than an irreversible stream of cultural goods?

If this holds for the material arts, it holds with tenfold force for much of non-material culture. In the former, a technically advanced people enjoys undoubted advantages. But for evolving the game of cat's cradle, the mother-in-law taboo, teknonymy, a dual number, or marriage by exchange of sisters, the Eskimo and the Semang are as well prepared as the Egyptians of 2,800 B.C., the Greeks of Pericles' period, or the most sophisticated European of today. The British diffusionists flatly deny this as regards beliefs in the supernatural. According to them, the concept of the soul could not have been originated by Natural Man, nor could that of divinity. Both first developed in Egypt about 3,000 B.C. and thence travelled to the hitherto non-religious heathen. For reasons I do not understand, the idea that dreams or visions might have suggested the notion of spiritual existence is flouted. That notion only evolved, we learn, when a king was mummified in order to be revived as

> the supreme life-giver of the State. The instinctive craving for life impelled men to devise measures for overcoming the disabilities of death (Perry, 87).

This view, according to which Negroes, Australians, and American Indians were wholly without beliefs in the supernatural from two to four thousand years ago again raises difficulties, especially when coupled with the view essential to the scheme that the subsequent religious career of all tribes is one of progressive bowdlerization. What conceivable interpretation can be given to Paleolithic burials apart from some notion of survival? And how does this doctrine fit in with its fellow-tenet that

> from the earliest times the members of our species (*Homo sapiens*) have regarded certain shells as elixirs of life and sought for them far and wide as amulets credited with tremendous magical powers (Elliot Smith, 50)?

Surely such powers represent a notion of the supernatural, and if Paleolithic man was capable of it, why not the Australian or the American Indian of, say, 500 A.D.?

Further, neither aboriginal ritual nor aboriginal belief can be interpreted solely or even largely in terms of degeneration. If Egyptian religion was the wholly impersonal procedure of mummification Perry (p. 71) describes; if Mexican ritual was nothing but a bowdlerized form of this prototype; then where, when, and how did that intensely personal religion of the Eastern and Plains Indian originate? Mr. Perry does not allow "many centuries" for the development. But how explain

a growth of such intensity and with so many minor variations in that way? And even if it conceivably developed within the space of, say, five hundred years, it would still not be a *decadent* ritualism but a growth of a wholly novel order.

These comments are not offered in a spirit of captious criticism. They are attempts to apply Messrs. Elliot Smith's and Perry's scheme in the concrete manner which an adequate historical reconstruction demands. They may be able to overcome some of the difficulties indicated; they can hardly ignore them. Even in their present form it cannot be denied that they stimulate an open-minded reader to re-examine the foundations of his convictions,—and that is always a good thing.

ROBERT H. LOWIE

Some Elements of Sexual Behavior in Primates and their Possible Influence on the Beginnings of Human Social Development. GERRIT S. MILLER, JR. (Journal of Mammalogy, 9: 273–293, 1928.)

In this paper Mr. Miller gives a valuable summary of eleven papers on the subject indicated in the title and takes to task Professors W. I. Thomas and B. Malinowski, as well as Mr. Brieffault and the reviewer, for ignoring the facts revealed. Since, however, not a single one of the articles abstracted was published at the time of Dr. Thomas' *Source Book*, and only three of them were available when the reviewer's *Primitive Society* appeared, two of the writers criticized seem to merit a fair measure of exoneration.

As for the upshot of the zoological observations, Mr. Miller points out that speculative anthropology is at fault in ascribing to *primates* patterns of sex behavior belonging to domestic ungulates and carnivores. Specifically, monkeys generally lack a period of heat or rut.

> Both sexes are ready for sexual activity at all times; and any reluctance on the part of a female arises either from fear or dislike as regards some particular male or from physical indisposition (p. 284).

The only differences Mr. Miller recognizes between human and anthropoid sex behavior are "a socially effective sentiment of love, and the physical and psychological possibility of rape" in man.

Mr. Miller is right in insisting that the biological facts concerning primate sex behavior must be considered by anthropologists who deal with ultimate origins of human family life. He seems, however, to overlook two facts. First, by no means do all anthropologists emulate Dr. Malinowski's bold attempt to go back to the prehuman beginnings. All of them know that what we consider as license is a widespread, perhaps universal phenomenon. Nevertheless, it holds true that *on the human level* the individual family is never abrogated by such usages. I, for one, am dealing with Andamanese, Australians, Chukchi, not with *Homo alalus* or *Pithecanthropus*. Secondly, while gratefully recognizing the interest of the facts emerging from Mr. Miller's summary, I do *not* find on closer reading that biology yields unequivocal findings. One author (p. 287 f.) describes the gorilla as monogamous, another as fiercely polygamous, one is doubtful as to the chimpanzee, another

calls it "usually monogamous." If there is neither uniformity among all primates nor agreement as to the behavior of the same species, zoology is not yet in a position to provide a solid foundation for anthropological reconstruction of the nascent stages of family life.

Notwithstanding these reservations, Mr. Miller's article is eminently worth reading, and ought to give students of social organization a stimulus to keep abreast of relevant zoological observations.

ROBERT H. LOWIE

Ein Versuch zur Rettung des Evolutionismus. P. W. SCHMIDT. (Internationales Archiv für Ethnographie, 29: 99–126, 1928.)

This is a rejoinder to a Dutch work (see AMERICAN ANTHROPOLOGIST, 31: 507, 1929) by Dr. Fahrenfort, in which Father Schmidt's views on primitive monotheism are assailed as dominated by a priori dogmatism. Needless to say, Father Schmidt is amply able to take care of himself. He points out many misunderstandings on the part of his critic, as well as a rather surprising unfamiliarity with the relevant ethnographic literature.

Not being acquainted with Fahrenfort's book, the present writer is not in a position to enter into the details of the controversy, which include such points as the interpretation of the Melanesian Qat, the Australian Bundjil, and other mythological figures. On several more general questions it is possible, however, to be quite definite. Father Schmidt is certainly right in denying that a preconception in form of unilinear evolution is any more warranted scientifically than any other preconception. As to the special point at issue, I see no a priori difficulty in crediting even very primitive tribes with a belief in a high-god. The concrete evidence seems to me of widely varying cogency in different cases. Thus, it is far too meagre for my taste as to the Tasmanians but wholly satisfactory for some of the Californians. Further, I have a high regard for the scientific character of Fathers Gusinde and Koppers (see AMERICAN ANTHROPOLOGIST, 26: 414, 1924) and believe that their statements on the Fuegians merit the most serious attention. Errors of observation and interpretation are always possible, but they are by no means limited to this problem or to believers in primitive monotheism. So unimpeachably fair a scholar as Dr. Swanton once questioned Morgan's statement that the Crow had maternal clans, yet such is undoubtedly the fact. From a similar bias I formerly denied that the Assiniboine had a clan organization, but I am now inclined to believe that they had at least traces of it. If Fathers Gusinde and Koppers are more receptive than other investigators to the notion that the Yamana have a high-god belief, they have provided reasons for their conclusion, which can be checked by the concrete evidence presented, e.g. in the prayers addressed to Watauinewa. Certainly if they had exercised the Machiavellian cunning ascribed to them and their preceptor, they would have suppressed the phrase "murderer in the sky," which is hardly consistent with the reverence due to a Supreme Being.

Evidence may be adduced from another domain of culture. Father Schmidt has described the Pygmies as monogamous and emphasized the stability of matri-

mony in the tribes of this *Kulturkreis* (*Völker und Kulturen*, 79, 1924). Father Schebesta has by no means suppressed contradictory evidence: he states that polygamy is permitted, though rare; and that childless unions are markedly brittle (*Bei den Urwaldzwergen von Malaya*, 93f., 271, 1927).

I am thus unable to detect that Father Schmidt exerts a sinister influence on his disciples. The whole of this more or less recurrent controversy strikes me as curiously anachronistic. It is especially strange when ethnologists, with whom it is a matter of professional honor to enter sympathetically into the psychology of head-hunters, cannibals and fetichists, find it impossible to divest themselves of prejudice in dealing with their fellow-students.

ROBERT H. LOWIE

Reallexikon der Vorgeschichte. Herausgegeben von MAX EBERT. Zwölfter Band. (Berlin: Walter Gruyter & Co., 1928. 466 pp., 115 pls.)

Volume XII of Ebert's encyclopedia contains substantial articles on the linguistic grouping of the Semites (14–50, Johs. Pedersen), of the Scythians (236–251, Max Vasmer), and the Slavs (273–291, P. Diels). The archaeological problems connected with the Scythians are discussed by J. Kostrzewski and G. Wilke (230 236), Slavic prehistory by R. Beltz (251–273). Sicily and the "Sikuler" are treated by Corrado and Ippolito Cafici (123–159, 188–207). The article on Siberia (55 71) is divided up among Obermaier for the Paleolithic, Gero v. Merhart for the Neolithic, and Tallgren for the Bronze Age. Stonehenge is described by A. Mahr (442–450).

In a contribution on South Africa (463–466) Obermaier reviews the meagre evidence, but without having been able to utilize Burkitt's recent summary (see AMERICAN ANTHROPOLOGIST, 31: 156, 1929). His treatment of the Solutrean (301–304) conveniently familiarizes the reader with Obermaier's present position. Following Hillebrand, he finds the origin of the Solutrean in Hungary, where caves harbor archaic prototypes—frequently in quartzite—of the laurel-leaf blade, which are strongly reminiscent of degenerate fist-hatchets, so that Mousterian affinities are indicated. In one grotto these finds overlie a meagre Aurignacian layer, elsewhere they underlie well-finished, elongated blades tending towards increasing thinness and flatness. This relatively advanced Eastern Solutrean extended into Poland, Moravia, Austria, and South Germany, but never reached North Germany, and eastward seems to have penetrated the Ukraine. Introduced into France, the technique attained the acme of perfection in the classical Solutrean. Obermaier seems to favor an independent origin of laurel-leaf blades in Central Africa, Somaliland, India, and America.

Thurnwald again contributes copiously on primitive social organization and government. His articles on the "Sippe" (170 sq.), the sororate (310), slavery (209 sq.), "Soziale Entwicklung" (312–330) and the state (358–373) may be specially cited. "Sippe" and "Klan" are not synonymous for Thurnwald, though the fluidity of these social units is recognized. He defines the clan primarily as a *political*

unit of kinsmen, who may be descended from several ancestors, while the Sippe is a lineage of relatives descended from the same ancestor and linked together for *economic* labor (170, 172). In the paragraphs on the sororate an error should not be allowed to pass unnoticed. While the levirate and the sororate occur among sibless tribes, it hardly holds true that these institutions are *mainly* (*hauptsächlich*) confined to such peoples; they often go hand in hand with a full-fledged clan organization.

Needless to say, no anthropological reader of this volume will fail to be instructed and stimulated by its rich and varied contents.

ROBERT H. LOWIE

Der Gang der Kultur über die Erde. ALFRED HETTNER. (Leipzig: B. G. Teubner, 1928).

The first edition of Hettner's *Gang der Kultur über die Erde*, a slender pamphlet, was stimulating to me because of its sketch of the Europeanization of the earth. In the past several centuries the culture areas of the earth have been terrifically deformed, destroyed, and replaced by the expansion of Western economy over the face of the earth. Commonplace enough the idea is, but a comparative analysis in geographic terms is needed and Hettner's essay is suggestive in its treatment of colonies of settlement, of hybridization, of exploitation, and of political domination imposed upon surviving native culture. If there is going to be such a thing as political geography, Hettner has written a program of inquiry for the modern colonial system.

In the present, second edition, the essay becomes a book of 164 pages, a book that attempts to review the course of development of cultures, for the whole world and for all time, in terms of the environmental conditioning of these developments. Ratzel redivivus, one suspects in the initial statement, only to find that the notes on geographic adaptation are pretty modest and obvious. The ambitious title of the book notwithstanding, it is really not pretentious in tone. I can think of nothing with which to compare it more fittingly than with a series of extension lectures of the more sober sort. For that class of reader it will probably be of value; to the professional anthropologist, or geographer, or historian it has very little to offer.

It seems to me therefore inappropriate to cite errors. The author has no original data to offer, only an already familiar interpretation. A three-page summary of pre-Columbian culture in America, followed by six pages on the classical Mediterranean, and seven on European culture in the Middle Ages and modern time,—how can one deal with the world at such a rate without abstracting sketchily from intermediate summaries? If one gets hold of a book that is outdated, or poor, one's orientation becomes distorted; certainly one cannot have critical judgment in all these matters of the origin of man, of prehistory, of primitive societies, of historical cultures. It would appear that Hettner has read pretty widely and pretty well, though certainly not profoundly. Hettner has no Messianic compulsion so far as

I know, which would urge him to write such a book, and in that respect he contrasts favorably with a number of his geographic colleagues. It may have been written under the same incentive that produces the majority of our text books, and I incline to regard it in the same manner, as a superior potboiler. You begin with sufficient knowledge of regional geography; you next select historical facts, in particular those concerned with changes in economy and population and relate them "genetically" to the physical environment. Though I have seen this done for a good many years, the manner of this causal association is still obscure to me. Nor does Hettner enlighten the reader as to the nature of this conditioning; he simply uses reasonable restrictions on his imagination. Without new data, without any new technique of inquiry, without original working hypothesis, without emphasis on a geographic critique of the concept of area or of cultural succession, I really know no very good reason why a student should read this book, unless it be that he provides a sufficient place for the work of Eduard Hahn's studies and a good appreciation thereof. Incidentally Hettner was one of the first to see the importance of Hahn's work. This review ends on a minor theme, suggested perhaps by the author's quaint shift, in closing denunciation of the *Schuldlüge*.

C. O. SAUER

NORTH AMERICA

An-nik-a-del. The History of the Universe as told by the Mo-des-se Indians of California. Recorded and edited by C. HART MERRIAM. (Boston: The Stratford Co., 1928.)

Dr. Merriam knows how to present Indian tales beautifully well. He has the sense of the dramatic qualities in the unwritten literature of the Indians. There is something faintly weird, distant, primeval, in the charm of the Indian stories. Grotesqueness is a strong element; so also is naïveté, a special kind of naïveté which consists in stressing the irrelevant. The sense of doom is often present, but no sentimental tears are ever shed by the Indian over fate or tragedy. All these characteristics make it very difficult to reproduce Indian tales without leaving out their charm. The great majority of the tales published by ethnologists are very dull reading. This is not the case with the myths recorded by Dr. Merriam. It is easy to see that he knows, understands, and loves the California Indians. I have never met Dr. Merriam, but wherever I have worked in the field I have always heard the Indians speak of him with warm affection, a tribute they do not often give to ethnologists.

The work under review is a small book of some hundred and fifty pages, well printed in large type, and agreeable to read. Its subject-matter, as indicated in the subtitle, is the creation myth of the Mo-des-se. The Madesi[1] are one of the local

[1] I am sorry to have to confess that I do not particularly like Dr. Merriam's way of spelling Indian words. I thoroughly agree with his principle that a technical phonetic transcription should be avoided in works intended for the general public. But a closer approxi-

groups of what is known loosely as the Pit River Indians. These people's territory stretches along some hundred miles of the Pit river, from its sources in the high plateau of northeasternmost California nearly to the point where it joins the Sacramento river. The Madesi are situated at the lower end of the territory, and were in contact with the Yana and the Shasta. For the last fifty years they have also been in contact with the advancing Wintun. In other words, they are located in a strategic position from the point of view of the diffusion of culture. For the past few years I have been engaged in studying the extremely complex language of the Pit Rivers, and while doing so, I have accumulated a certain amount of ethnographic material, especially at the eastern end of the territory. I have come to think that there are a great many more points of difference between the cultures of the eastern and western portions than has been generally assumed by ethnologists. The present creation myth would seem to bear this out. Dr. Merriam himself points out that his tales differ considerably from those published either by Jeremiah Curtin or by Roland B. Dixon. I may add that they also differ considerably from those obtained by myself.

The classical personages of Pit River mythology are indeed all there: Silver Fox, Fisher, Eagle Girl, Weasel, Cocoon-Man, Spider-Woman, etc., not to mention the ubiquitous Coyote. Their characters are very much the same as in the eastern part of the territory. A good many even of the minor incidents are alike. But the general setting is totally different. Here I come to the most interesting feature of the collection presented by Dr. Merriam: it is a connected and organized whole from end to end. It is indeed, as the author says, a systematic account of the creation of the universe. That is precisely what I have always failed to obtain. I have heard several variants of "how the world was made" from the mouths of older Indians. The accounts differ considerably. Each old man claims his to be the true account. As one young Indian exclaimed to me once in despair: "I should myself like to know how the world was really made. But you can't find out. Every man tells it differently!" Not only are the accounts different, but most of them do not relate a true creation *ab orto*, only a re-creation *de novo;* i.e., the world has been destroyed (for one cause or another), and the story tells how and by whom it was rebuilt. Most of the Indians are aware that a primary world existed once before it was destroyed, but how this primary world came into existence appears to them an irrelevant question. Why should it not have been always? In Dr. Merriam's account, however, there is a very definite (and, incidentally, quite poetical) beginning. The origin is assigned ultimately to Tik'-a-do He-da'-che. I have never heard this person mentioned before, but I think I can understand what the words mean from his translation: "the World's Heart." I myself should have preferred to translate: "the World's Thinking,"[2] but the point is immaterial. The

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mation to it, such as the one used for example by Dr. Kroeber in his *Handbook of California Indians*, would, I think, serve even the general public better than Dr. Merriam's adherence to the vagaries of English spelling.

[2] tĕ'qá'dé-ú hày-dûtsl means literally "world-of think-ing."

conception is a grand one, and, let me add, one by no means too abstract for the Pit River type of mind. This Tik'-a-do He-da'-che, however, comes into action only a few times in the story. The bulk of the creation is referred to An-nik'-a-del, his grandson. Annikadel is back of everything. He superintends the whole creation. What he does not actually do himself he causes others to do by sending them the idea in a dream. Only on certain grave occasions does he return to his grandfather, World's Thinking, to get counsel and power. Annikadel lives in the air, always.

His underparts were blue and white—the colour of the sky, so no one in looking up could see him. The most that anyone ever saw of him was a glint of light.

Annikadel recurs from one end of the book to the other. He has all the characteristics of a Transformer Hero. This Annikadel is an entirely new personage to me. I have never heard of him before, and I cannot think to what he corresponds in the Pit River mythology with which I am familiar. Dr. Merriam does not give any translation of his name. I have a suspicion (not more than a suspicion) that he is a phonetic corruption of Erikanner, the Transformer Hero of the Shasta.

An important part of the story concerns Moon-Man and Sun-Woman. The tale of how they are discovered beyond the limits of the world in the west, then transported back to far-away ice of the eastern end of the world, and finally shot up into the sky, is a beautiful one. It also is an entirely new one to me, as a Pit River myth. I have never seen any of my Indians show the least mythological interest in either sun or moon. On the other hand, some of the incidents of the story are familiar to me as forming part of the mythology of the north-central California tribes;[3] such are, for instance, Moon-Man's attempt to kill his son-in-law, or the occurrence in pairs of certain characters (the Mice Brothers, the Lightning Brothers, the Thunder Brothers, the Raven Brothers, etc). The work on Sun and Moon is performed at the risk of many dangers by Fisher and his younger brother Weasel. These are two well-known characters of Pit River mythology. Their exploits as recounted in this tale, however, are entirely different from what I have heard before. On the other hand, many incidents are identical with the Shasta story of Erikanner and Erihutiki recorded by Roland B. Dixon. Finally, the Dragon here called Kwillah is perhaps the famous Kilak of the Pomo. On the whole, I have a strong feeling that the present creation myth is a synthesis of the folklore of the Pit Rivers, of the Shasta, and of the north-central Californians.

It is evident that Dr. Merriam was very fortunate in discovering such a good informant as William Hulsey. Dr. Merriam speaks of him as a very remarkable man with a rare bent for speculation and philosophizing. I had already heard a good deal about Hulsey's knowledge from his friend, William Ralganal Benson, the Pomo chief whom so many of us have known. Benson's is another example of the speculating and philosophical type of mind among Indians. Men of this type are not satisfied with disparate chunks of information. They cannot help organizing their knowledge into a whole. Try as they may to preserve intact the traditional lore, they unconsciously inject into it the knowledge they have acquired from

[3] By Jaime de Angulo and L. Freeland, Miwok and Pomo Myths. Journ. Am. Folk-Lore, 232–252, 1928.

contact with other tribes, from contact also with the whites. It is possible that we have here an example of the product of one talented mind working under special circumstances of cultural diffusion on the raw material of primitive literature.

Be that as it may, we have to thank Dr. Merriam for having preserved, and presented in most readable form, a real work of primitive art. This little book can be recommended to any lay reader who wishes to acquire a real feeling for the unwritten literature of the California Indians.

JAIME DE ANGULO

AFRICA

Les Bas-Reliefs des Bâtiments royaux d'Abomey (Dahomey). EM. G. WATERLOT. (Université de Paris: Travaux et Memoires de l'Institut d'Ethnologie 1: vi, 1–10, 23 pls., 1926. 70 fr. outside of France.)

This small and interesting volume is the first of the series issued by the Institut d'Ethnologie of the University of Paris. It is of convenient size, well printed, and well bound.

This number is devoted to the reproduction and interpretation of thirty-six bas-reliefs which among others adorned the ancient palaces of the Dahomey kings. Models and photographs of the reliefs were obtained by M. Waterlot in 1911. Their meanings were explained to him by a son of Gbèhanzin, who reigned 1889–94, by a minister of the latter, and by an old palace guardian. The subject and author are introduced by Professor L. Lévy-Bruhl. The text is annotated by Messrs. Maurice Delafosse and Le Hérissé.

Following a brief account of the history and extent of the Dahomey kingdom, and a list of the Dahomey kings, the author describes the construction of the palaces. The "*grand palais d'Abomey*" consists of groups of dwellings, altars, and tombs, each group having been built by a reigning king next to that of his predecessor. In the walls of the buildings, which are of earth, oil, and kaolin construction, are imbedded the bas-reliefs (pls. 1, 3, 4*b*), raised modellings which represent important events relative to the various rulers. Those pictured in this volume are from the palaces of Agadja, 1708–1728 (pls. 3, 4*b*–8*a*); Ghèzô, 1818–1858 (pls. 8*b*–15); and Glèlé, 1858–1889 (pls. 16–22).

The subjects pictured are allegorical, historical, and personal in reference. Though the stylistic treatment may be characterized as primarily realistic it possesses a marked convention. There are but one or two figures in each picture; these are executed with a pleasing clumsiness and simplicity. Graphic essentials are emphasized, merely decorative details omitted. The Dahomey artists were not prey to the "fear of vacant space" of which primitive artists are so often accused; each relief stands as a well balanced but by no means symmetrical unit against an absolutely plain background. As to color, little may be said since its accuracy is uncertain. The bas-reliefs from the palace of Agadja are plain due to weathering, the others, restored, are in two to five pure colors. Red, blue, green, yellow, tan, grey, and black are variously employed. The walls and background appear in a neutral yellow-grey.

That the decorations of Agadja's palace actually antedate those of Ghèzô and Glèlé by one hundred years is uncertain. Whether this is so or not, there are no

stylistic differences between them other than would be attributable to the individuality of the executors. They all represent a traditional genre.

Plate 23 shows the heads of twelve *récades*, kings' batons of wrought metal. Each illustrates the owner's name in rebus symbols. Their meanings have been interpreted by M. Le Hérissé. The delicate workmanship of the *récades* is an interesting contrast to the naïveté of the bas-reliefs.

M. Waterlot's publication permanently preserves the appearance and history of these fast crumbling relics of Dahomey art. It is of interest not only to those concerned with the analysis and comparison of primitive art forms but to the layman as well, for whom it should hold a sprightly interest.

A. H. GAYTON

ASIA AND OCEANIA

Rossel Island; An Ethnological Study. W. E. ARMSTRONG. With an Introduction by A. C. HADDON. (Cambridge, At the University Press, 1928. 274 pp., 24 pls., 10 maps and diagrams.)

Mr. Armstrong's *Rossel Island* will be of chief interest to students of Oceania and to those who are interested in the strictly formal statement of the structure of society. The result of two months' field work, apparently of the special informant type and conducted in pidgin English, it is an interesting catalog of ethnographic facts about Rossel, bound together neither by vivid descriptions of the way the society operates nor by any illuminating statements as to the nature of the culture as a whole. Although there are some serious omissions in the information obtained in such matters, as the way in which the *Binda* relationship affects the customary kinship terminology, the most conspicuous defects in the book are due to the author's not having seen the culture in operation.

The most bizarre and arresting element in the culture is the monetary system, already familiar to us through earlier publications of Mr. Armstrong's. The characteristic Melanesian delight in complicated economic transactions has reached its apotheosis on Rossel in a system of two series of ranked coins, in which each coin in a series is conceived as equaling the value of the previous coin plus a certain increment of interest. The scarcity of one of these series and the arbitrary insistence upon the discharge of certain important economic obligations, such as the payment for a wife, in terms of certain coins, makes borrowing inevitable. Professional brokers handle these loans and use magic to influence their creditors towards quick payment and to prevent their debtors from pressing them too closely. Upon the two roots of an elaborate monetary system involving interest computed in fairly definite time units and the old barter concept in which certain objects alone can command certain other objects, the Rossel Islanders have elaborated a social ritual of financial transactions to which Mr. Armstrong devotes a chapter on Monetary Ceremonial. His strict interpretation of the values of the coins may or may not seem plausible to other students. It is difficult to reconcile statements such as, if Coin No. 1 be kept "a *rather longer* period of time" (the italics are my own), "No 3 would be required to cancel the debt" and his belief that "the relationship of any value to any other in this series may be expressed by the formula value of No. n—value No. $m(1+k)^{(n-m)}$ where m and n are the two integers representing the number of

the value in the above series and *k* is a constant. But whether or not the reader is willing to credit the Rossel system with the degree of mathematical finesse which Mr. Armstrong attributes to it, it remains a most curious and isolated example of complexity in the midst of the usual simplicity of Oceanic systems.

Probably the second point of greatest interest is the religious system, which while presenting no completely new conceptions yet possesses real individuality. Besides the typical paraphernalia of sorcery and spirits of the dead, Rossel has a large number of sacred places, *yaba*, with special attributes of influencing man and nature for good or for evil. These places have their peculiar tabus, they must be guarded and kept in order by priests and lack of care or sacrilege will produce evil consequences to mankind. As Mr. Armstrong summarizes it:

> The universe is like a machine, with a few exposed parts, which, so long as they are kept clean, insure the smooth running of the whole. That is the chief religious duty of man; but the machine requires oiling at times, and we find that this is the more positive duty of priests of certain of the more important of the *yaba* that give a beneficient reaction.

Thus the Rossel Islanders have made a positive interpretation of the tabu attitude, mere avoidance has been turned into a ritual of anxiety. It affords illuminating comment on the way in which pure tabu, a supernaturalistic attitude requiring neither priests nor rituals, can provide a groundplan for a religious system. The Maori development in which the inevitability of broken tabus furnishes the basis for a system of propitiatory and expiatory rituals with a priesthood, is another example of a religion elaborated from the tabu attitude.

Mr. Armstrong himself is very much interested in the formal aspects of social organization, particularly kinship systems. In Chapter II, on "Tribe, Clan and Family" and Appendix III, "General Theory of the Classificatory System of Relationship," he expounds at some length a number of theoretical considerations. He distinguishes between "groups" and "groupings," the former fixed social forms through which numbers of individuals pass, i.e. an age society, the latter aggregates of individuals such as blood kin, in which each individual takes a place peculiar to himself and stands in a serial relationship to other kinsmen. Although the point is logically sound it seems to contribute very little to an understanding of the dynamics of society to express mobile human relationships in ideal mathematical terms. The theoretical discussion usurps the scene and leaves the reader with no picture of the working of Rossel society. Similarly in his elaborate hypotheses concerning the logical possibilities inherent in the classificatory system, Mr. Armstrong neglects the Rossel kinship system rather sadly. In order to explain the fact that sisters' children outrank brothers' children, he invokes a top-heavy hypothesis, *à la* Rivers, of the coincidence of marriage with the mother's brother's wife and the breakdown of a class system. In reading either of these theoretical treatments, it is impossible not to feel that Mr. Armstrong has forgone the peculiar privilege of the field ethnographer of adding to our exact knowledge of the workings of new varieties of human culture. Instead of illuminating the working of Rossel Island culture, he has treated it rather cursorily and chosen to deal in elaborate generalities.

Students of Melanesia will be interested in the occurrence of the prostitute who is owned by a group of men who also benefit from payments received for her ser-

vices to others. The occurrence of similar institutions in Micronesia, Santa Cruz, the Southern New Hebrides and the Admiralty Islands presents an interesting distribution. In contrast to the Trobriand belief about childbirth which assigns such slight role to the father, the Rossel Islanders overestimate the rôle of the father, who is believed to deposit an egg in the female and to form it through subsequent intercourse. The spirit is also believed to be obtained from the father. Such comparisons of Rossel beliefs and practices with those of neighboring peoples are all too rare, and one could wish that Mr. Armstrong had drawn more extensively upon his longer experience among the Massim.

MARGARET MEAD

Peoples of Asiatic Russia. WALDEMAR JOCHELSON. (The American Museum of Natural History, 1928. 259 pp., 10 mps, 53 ills.)

This is an extremely useful summary of the racial and linguistic affiliations of the innumerable peoples indicated in the title. Mongoloids, Americanoids, undetermined Siberians, the Nations of Turkestan, the Asiatic Steppe Provinces, the Caucasus, and the Iranians all receive separate chapters, which are followed by sections on Somatology, Mode of Life, Migrations, and History. There is a certain unevenness of treatment, insofar as the ethnographic description is by no means uniformly given for all groups. It is rather strange that, ignoring Licent and Teilhard's researches, Dr. Jochelson should deny paleolithic remains to China; and still more so that he accepts Pumpelly's chronology for Turkestan (p. 232f.). But notwithstanding such details he has conferred on all ethnographers a priceless boon.

ROBERT H. LOWIE

Adoption among the Gunantuna. JOSEPH MEIER, M. S. C. (Washington, D. C.: Publications of the Catholic Anthropological Conference, 1: 1-98, 1929.)

The more technical series of the Catholic Anthropological Conference auspiciously begins with this paper by Father Meier. The Gunantuna occupy the northeastern section of the Gazelle peninsula and represent a typical Melanesian group. The author, who resided among them from 1899 until 1914, wisely sketches their general culture before going into details as to the adoption ritual. Except in one district this tribe is divided into exogamous matrilineal moieties, but, as usual, this rule of descent does not imply feminine ascendancy. The men do the most important part of the horticultural work and own virtually all the property held. Incidentally, we learn the interesting fact that simple barter does not occur, all business being transacted through a transfer of shell money (p. 13). There is patrilocal residence and nepotic inheritance (pp. 14, 17). On his main theme Father Meier contributes a wealth of concrete information, illuminated both by texts in the original and by specific biographical material. The psychological motives leading to adoption are fully discussed. In several respects the paper suggests intensive comparison with Dr. Rivers' and Professor Malinowski's researches on Melanesian peoples. Both Father Meier and the Conference may be congratulated on this eminently worthwhile contribution.

ROBERT H. LOWIE

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DISCUSSION AND CORRESPONDENCE

Prehistoric Man

To the Editor,

The American Anthropologist,

Sir:

Mr. N. C. Nelson has been so good as to send me a copy of his review of my book *The Antiquity of Man in East Anglia*, which appeared in the American Anthropologist, vol. 30, no. 4, October-December, 1928. Though it is somewhat unusual for an author to comment upon the opinions expressed by reviewers upon his books, yet, in view of the fact that Mr. Nelson has, I doubt not unintentionally, made certain misleading statements upon my discoveries and their interpretation, I feel it to be necessary to place on record the following remarks. Mr. Nelson states that I stand alone in my reading of the geology, "in particular to the commencement of the Ice Age," but though standing alone in matters which I have closely examined does not alarm me, in this case I am in the company of two very well known geologists, Penck and Bruckner, whose views upon when the Ice Age began coincide with mine. I conclude that Mr. Nelson imagines that I refer the flint implements found beneath the Red Crag to the base of the Pleistocene formations. If, however, he will again refer to my book he will find I make it abundantly clear that these artifacts and the deposit in which they occur are in my opinion to be relegated to Pliocene times. It is incorrect to describe the flint implements found beneath the Red Crag as "crude and shapeless," and as "unspecialized hammers, scrapers, and perforators." They are, taking into consideration their great antiquity, as clearly shaped, specialized, and obviously as useful as the stone artifacts of any later prehistoric period.

Further, it is solely the sub-Red Crag rostro-carinate specimens upon which I lay stress as being truly transitional between the Eolithic point and the earliest Chellean hand axe.

Two superposed floors were discovered by me in the Red Crag at Foxhall, near Ipswich. This is truly a "succession," as described by Mr. Nelson, but his readers might imagine that I had found a greater number of occupation levels at this place, which would be unfortunate.

Mr. Nelson states that from the Cromer Forest Bed

> up through the successive glacial deposits, the discoveries in East Anglia conform to the findings elsewhere in western Europe. Mr. Moir's contributions are therefore his discoveries beneath the Norwich and Red Crag formations, with the Red Crag itself and within the Forest Bed Series.

Mr. Nelson, however, in these matters has once more gone astray.

In the first place the discoveries, as is plainly set forth in my book, made below the Norwich Crag are to be referred to the late Mr. W. G. Clarke and not to me.

Secondly, though the correlation of the palaeolithic industries of East Anglia with the glacial deposits of that area, which I published in 1920, has had an ever increasing number of supporters, yet when it first appeared those who agreed with me were very few.

For instance, I place the Acheulean industry in the second Inter-glacial phase. It would be interesting to know if Mr. Nelson regards this as conforming with the findings elsewhere in western Europe?

My conclusions, also, were not exactly enthusiastically received in England, where most geologists and archaeologists looked upon even the earliest traces of man as post-glacial in date.

Further, for good or for ill, my "contributions" extend beyond the strata and periods mentioned by Mr. Nelson. I have shown that the glacial boulder clays and the gravels which separate them contain palaeolithic flint implements, and I have established the occurrence of Upper Palaeolithic "stations" in the eastern England, a fact disputed for many years by both English and Continental archaeolcgists. I fail to follow Mr. Nelson's reasoning by means of which he arrives at the conclusion that because two views differ in their opinions neither view is in consequence worth very much.

There are, so far as my knowledge extends, very few archaeological questions upon which markedly divergent opinions are not expressed, but it is remarkable that so large a proportion of those who have examined my specimens agree that they represent, without question, the work of man. An International Committee, of whom the late Dr. Capitan was a member, has definitely accepted this conclusion, and it is not fair to suggest, as does Mr. Nelson, that he (Dr. Capitan) had any doubts upon the human origin of the sub-Red Crag flints.

It is, in fact, only a small and irreconcilable minority, of which I regret to note Mr. Nelson is one, who refuse to believe in the reality of my discoveries.

Mr. Nelson dwells upon what he terms "professionals" and "amateurs" and seems to suggest that the opinion of the former possesses some inherent and mysterious value.

Personally I regard, as the only quality which can entitle anybody, either professional or amateur, to pronounce upon the human or material origin of flaked flints, to be *a thoroughgoing and practical knowledge of flint fracture*, and unless he possesses this he ought to be severely discouraged from making public his views upon this important matter in any serious scientific publication. Mr. Nelson is, I fear, somewhat behind the times in his views upon prehistoric archaeology. He would have us remain in the chaotic state regarding our knowledge of ancient man existing 40 years ago. This is not only impossible, but regrettable.

J. Reid Moir

A Chiriguano Canteen

The Chiriguano Indians (Tupi Stock) of Bolivia formerly had the custom of wearing on journeys a pottery canteen fitting over the wrist. The custom has been

obsolete about 50 years, and specimens of the canteen are now very rare. A specimen has been given the National Museum by Senor Ignacio Arana, of Pipi, Province of Santa Cruz, Bolivia, through Dr. Edwin Kirk, who has returned lately from Bolivia. The vessel is a hollow ring, 6 inches in diameter, with an opening large enough to allow slipping on the wrist or forearm, and has the mouth with neck on the upper side. The paste is dark brown and has been washed with buff on which is painted the design.

In drinking, the canteen is brought up to the mouth by flexing the arm. The specimen is not only an unique canteen but represents extreme skill in its manufacture. Vessels of this shape, but small, are sometimes found in the ancient Pueblo ruins.

WALTER HOUGH

MEETINGS

The Semi-Centennial of the Anthropological Society of Washington

The Anthropological Society of Washington was organized on February 10, 1879, and therefore it was decided to turn the regular meeting scheduled for Feb. 19, 1929, into a special gathering commemorative of the event. This took the form of a dinner at the Cosmos Club, at which about sixty members and friends sat down. There followed addresses by present and former members of the Society, and by invited speakers.

The President of the Society, Dr. Charles L. G. Anderson of the U. S. Veterans' Bureau, opened the formal part of the occasion by a few words of welcome to the distinguished guests, the members of the Society, and their friends. In the course of his remarks he said, "It has always seemed to me that the term anthropology is the most inclusive word in our language. In a large sense, anthropology embraces all history, all biography, all records of the reactions of human beings to their environment. Observation of man by man is the oldest of studies. When man began to note phenomena connected with men and races, compare them with data obtained by other investigators working in the same line, and only then venturing to draw deductions and conclusions, then was the true science of anthropology born. Anthropology, so defined, is of recent growth, and we believe that our Society has played a not inconspicuous part in it. In this connection allow me to read the following letter:

Dr. Charles L. G. Anderson,
President, Anthropological Society of Washington,
Washington, D. C.

"My dear Dr. Anderson:

"As President of the American Anthropological Association, I am sending the congratulations of this organization to its parent, the Anthropological Society of Washington. The whole history of Anthropology is written in these fifty years of its existence.

"In looking up the history of anthropology in America, I was surprised to find that Section H of the American Association for the Advancement of Science was not organized until twenty years after the founding of your Society, and the American Anthropological Association came along three years later. The Washington Society should feel proud of its record, and I wish its second half-century to be as successful as its first.

"With the respect due from a child to its parent, I sign myself,

Alfred M. Tozzer,
President, American Anthropological Association.'

The President then introduced the Toastmaster of the evening, Dr. George A. Dorsey, for many years Curator of Anthropology in the Field Museum of Natura History, Chicago, a long-standing member of the Society, and intimately associated with many of the men prominent in its history.

Dr. Dorsey alluded briefly but feelingly to former members of the Society with whom he had been intimate.—Major John Wesley Powell, founder of the Bureau of American Ethnology; Prof. Otis T. Mason, for many years head curator of the Division of Anthropology in the U. S. National Museum; W. J. McGee, long associated both with the Geological Survey and the Bureau of Ethnology; Thomas Wilson also of the National Museum; Frank Hamilton Cushing, of the Bureau; Alice C. Fletcher, well-known for her work in the U. S. Indian Office and in Ethnology; Dr. Daniel S. Lamb of the Army Medical Museum; Capt. John Bourke, Dr. Washington Mathews, and James Mooney, all known for their Indian researches. He then introduced Mr. Felix Neumann, Assistant Librarian of the Army Medical Museum, who gave a brief sketch of the history of the Anthropological Society, the substance of which was as follows:

In the 27th year of its existence Dr. Daniel S. Lamb gave as his presidential address, on May 9, 1905, the history of the Anthropological Society of Washington from its foundation up to that period. Dr. Lamb's excellent paper is not only an indispensable source for the history of the Society itself but an outstanding contribution to the history of American anthropology, as will be evident when we take into consideration the fact that our Society is the oldest anthropological Society in the United States to have enjoyed uninterrupted activity.

Dr. Lamb would have been turned to as our natural historian for the period subsequent to 1905 but to our great regret his health has not permitted him to undertake the task. In thought, however, he will be with us tonight.[1]

In the scientific life of Washington our Society has played an important role. Although it is not the oldest in our city, it was preceded by only two, the Medical Society of the District of Columbia, founded in 1819, and the Philosophical Society, founded in 1871. Some years after our Society came into existence a number of others arose concerned with various branches of the exact and social sciences, and such of them as dealt with subjects allied to anthropology naturally affected our own somewhat adversely, as regards membership, though not in standing and importance.

The meeting for organization was held on February 10, 1879, while at the second meeting, February 17th, the constitution drafted by Dr. J. M. Toner, Dr. Wills de Has, and Col. Garrick Mallery, was in part adopted. From its name one would infer that its main concern was with physical anthropology, ethnology, and prehistoric archaeology, but among its founders there were men, not only known and admired for their scholarship in their chosen specialty, but so versatile and of such broad culture, at home, in so many other branches that, on their initiative, the scope of the Society was soon enlarged. Thus the following subjects were added: psychology, esthetology—which deals with the artistic and play activities of different tribes and races—technology, sociology, philology, and sophiology—the last mentioned, the material history of science and philosophy—and, still later, criminal anthropology.

[1] We have to report with regret that Dr. Lamb died on April 21, 1929, in his eighty-third year. He was born May 20, 1843. On May 18 a joint memorial meeting was held in his honor in the building of the District Medical Society at which were represented the Anthropological Society of Washington, the District Medical Society, the Medical Faculty of Howard University, and the U. S. Army Medical Museum. Dr. Aleš Hrdlicka spoke on that occasion on behalf of the Anthropological Society.

I cannot enumerate all of the founders and early members of our Society tonight, but will give brief mention of those who were not only outstanding figures in the history of our local body, but will always have places in the history of American anthropology and American science.

The man who deserves first mention, not only because he was our first President, an office he held nine times, is Major John Wesley Powell (1834–1902). Soldier, explorer, geologist, and anthropologist, his name is an outstanding one in the scientific history of our country. His exploration of the canyons of the Green and Colorado rivers, "an undertaking of phenomenal boldness" as Gilbert called it, carried a knowledge of him all over the world. In 1879 he became Director of the new Bureau of American Ethnology, and as long as he lived he was the leading spirit of our organization.

Professor Otis Tufton Mason (1838–1908), should be mentioned next. He was one of the Founders of the Society, and took the greatest interest in its development. He was a prominent member of the drafting committee of its constitution and served twice as President, in 1893 and 1894. In 1884 he was appointed Curator of the Department of Ethnology in the United States National Museum, to be promoted later to the position of Head Curator. To Professor Mason we are indebted for the name of our Society, for it was he who insisted upon adopting the title "The Anthropological Society of Washington" instead of "The Archaeological Society of Washington," as was proposed by some others.

Dr. Robert Fletcher, also a Founder, was born in 1823 in Bristol, England, and died in Washington in 1912. He studied medicine in the Bristol Medical School, came to the United States in 1847, and became engaged in the practice of medicine in Cincinnati. He entered the U. S. Army at the opening of the Civil War in 1861, and subsequently became connected with the Office of the Provost-Marshal General of the Army in Washington, where he specialized in medical and anthropological statistics. During this service he published *An Outline of the History of Anthropometry*. In 1876 he was appointed Assistant Librarian in the Surgeon General's Library. Among the many anthropological papers which he read before our Society, one entitled "The New School of Criminal Anthropology" opened up a wholly fresh field of observation. It was my good luck to work under Dr. Fletcher during the last years of his life, and I admired the wide scope of his learning. He was one of the best representatives of the old school of scientists.

Another librarian, and a very active member of our Society was Dr. Ainsworth Rand Spofford (1825–1908). He was Librarian of the Library of Congress from 1864 to 1899, and first Assistant Librarian from 1899 until his death. It was my good fortune to work under him also, and it was he who made the Anthropological Society of Washington known to me by inviting me to attend a meeting in which he read a paper on "Rare Books relating to the American Indian." He read altogether twelve papers before it, each one showing erudition and mental breadth.

Dr. Lester Frank Ward (1841–1913), another founder of the Society, was on the staff of the U. S. Geological Survey from 1881 to 1888. His early researches were in paleobotany, but he soon interested himself in the study of human society and in the field of sociology he acquired his greatest reputation. He read papers before the Society frequently and remained an active member until he was called to fill a professorial chair at Brown University.

I wish to name two other members who addressed our Society many times, and who have a distinguished record in the history of American anthropology. The first of these is Dr. Washington Matthews (1843–1905). He was born in Ireland, and entered the Union Army during the Civil War as a surgeon. Major Powell regarded him very highly and was instrumental in having him detailed, from 1884 to 1890, to the Army Medical School in

Washington. Most of his work was devoted to craniology and anthropometry. Albert Samuel Gatschet (1852–1907) was appointed by Major Powell in 1879, as Ethnologist in the Bureau of American Ethnology, where he served until 1903. His fundamental publications on the different Indian languages put him in the front rank of American linguists of his time.

Of our deceased Presidents, I wish to mention tonight three more: Dr. Frank Baker, Miss Alice Cunningham Fletcher, and James Mooney. Dr. Baker was born in 1841, and died in 1918. He was Professor of Anatomy in Georgetown University from 1883 until the time of his death, and Superintendent of the National Zoological Park from 1892 to 1916. Dr. Baker was one of the Founders of our Society and served as its President in 1897. Those who were honored by his friendship will always remain devoted to his memory.

Miss Alice Cunningham Fletcher, founder of the Women's Anthropological Society of Washington, which later became part of our Society, was born in 1845, and died in 1923. Miss Fletcher was the first of our ethnologists who made a special study of Indian music and she became a leading authority on this subject, now so successfully persued by Miss Frances Densmore, also one of our members.

Mr. James Mooney (1861–1921) early became interested in the American Indian and attracted the favorable attention of Major Powell, who in 1885 offered him a position in the Bureau of American Ethnology, which he held until his death. He was a prolific writer and his contributions to the ethnology of the Indians rank very high. He was our President in 1914 and 1915.

Amongst other prominent Founders I should like to mention Frank Hamilton Cushing, (1857–1900), and Col. Garrick Mallery (1831–1894). Both were members of the Bureau of American Ethnology and left an excellent impress on the history of our organization. Also as Founders, we have Dr. James E. Morgan (1822–1889) and Dr. Joseph Meredith Toner (1825–1896), two leading members of Washington's medical profession, who are not yet forgotten. Another member of the medical profession and a very active and prominent member of our Society, is Dr. Harry Crecy Yarrow, born in 1840, who is still with us. W. J. McGee,[2] (1853–1912) was one of the best known American scientists and was Assistant Director of the Bureau of American Ethnology from 1893 to 1903. He was three times elected President of this body, and added a great deal to its lustre.

Among living members who have done much for American anthropology and ethnology, and who have never faltered in their interest and love for it I will mention Prof. William Henry Holmes, Dr. Clinton Hart Merriam, Dr. George Martin Kober, Dr. Jesse Walter Fewkes, and Mr. Frederick Webb Hodge, three of them former heads of the Bureau of Ethnology, and all past Presidents.

Between the time when our Society was founded and 1888 its Transactions were published infour volumes. In 1888 was begun the publication of an anthropological journal entitled the AMERICAN ANTHROPOLOGIST, under the auspices of the Society and mainly supported by it. This continued until 1898 when the journal became the organ of all American anthropologists and ceased to have a purely local character. On the formation of the AMERICAN ANTHROPOLOGICAL ASSOCIATION it was adopted as the organ of that body, but it is at the same time the organ of the Anthropological Society of Washington and the American Ethnological Society of New York.

In its earlier years meetings of the Society were held twice a month. They now take place regularly on the third Tuesday of each month and at such other times as the President and Board of Managers may determine. In the years 1893, 1894, and 1896 series of Saturday

[2] Since this commemorative occasion the society has to lament the loss of Dr. Yarrow as well as Dr. Lamb. Dr. Yarrow passed away at Fort Monroe, Va., July 2, 1929.

afternoon lectures were held in which papers of general interest were read. These lectures were greatly appreciated by the public and were well attended.

Dr. George M. Kober, recently retired Dean of the Georgetown Medical School, whose subject was "Reminiscences of Early Members," stated that he had been a member of the Washington Society for over forty years and testified to the great benefit he had derived from attendance at its meetings. He also expressed indebtedness to it for its choice of him as presiding officer for several years and for various attentions members of the Society had bestowed upon him. He expressed the highest regard and esteem for the ability of many of those connected with it, especially mentioning Powell, Mason, Cushing, Hough, Fewkes, Miss Fletcher, and McGee. Of McGee he said:

I was very greatly pleased to listen to the beautiful tribute in memory of Professor McGee, delivered at the fiftieth anniversary of the Cosmos Club by Governor Pinchot, who, as we know, was the promotor of President Roosevelt's first congress of governors for the conservation of national resources held at the White House May 13–15, 1908. In his tribute he emphasized the fact that McGee showed his remarkable versatility more particularly in the selection of scientific experts for the presentation of addresses before that congress.

Dr. Kober also referred to the splendid work of the Society and its members in publishing, and in promoting the publication of anthropological papers, and he instanced the two following examples of humanitarian uses performed by some of the scientists belonging to it.

The investigations of James Mooney and Dr. Washington Matthews among the Cherokee Indians of North Carolina in 1888 revealed the sad fact that their birth-rate was lower than their death rate and that the tribe was practically dying out. Thanks to the publicity given by these men, and the application of preventive and remedial measures, these Indians are no longer a vanishing tribe. On May 31st, 1922, in response to my inquiry, Dr. McBrayer, in charge of the North Carolina Tuberculosis Sanatorium, forwarded to me tables relating to the vital statistics of the White, Colored, and Indian population in North Carolina from 1918 to 1921. In commenting on this table the doctor writes, "A birth rate of 43.2 against a death rate of 12.9 does not look very much like a vanishing race." These figures were confirmed on May 30, 1922, by the following Table received from Dr. W. S. Rankin, the secretary of the Board of Health of North Carolina based on the vital statistics for 1921:

Race	Birth rate per 1,000	Death rate per 1,000	Tuberculosis death rate per 100,000
White	32.9	9.6	67.7
Indian	43.3	12.7	67.0
Negro	34.5	14.3	186.6

The foregoing statement finds ample support in the records of the U. S. Census Bureau which show that the enumeration of Indians in 1920 reveals an increase of 7,241 in the Indian population since 1900. The only pronounced increase was reported for North Carolina from 7,851 to 11,824. The only other states which had in 1920, 1,000 or more Indian inhabitants and which reported increases in Indian population were Louisiana, Texas, Montana, Arizona and California.

I look upon this as a happy end-result of the investigations begun by two distinguished members of our Society. They have gone to their reward long since. I am sure it would have been a source of great gratification to them to have realized the fruit of their labor.

In this connection I also recall with great pleasure because of its practical results a joint meeting with the Women's Anthropological Society held in 1896. At that meeting Miss Clare de Graffenried presented an address on the housing conditions of our least resourceful people in Washington, based upon a survey of our alleys and slums. The survey had been financed by the Women's Anthropological Society and by the Housing Committee of the Civic Center, of which I was chairman.

The meeting, held at the Cosmos Club in the winter of 1896–1897, was largely attended, and among those present were the founders of the *Evening Star*, Mr. S. H. Kauffmann and Mr. Crosby P. Noyes, who were also members of the Washington Anthropological Society. These gentlemen were so much interested in the subject that they subsequently subscribed very liberally to the stock of the Washington Sanitary Improvement Company, which was founded for the purpose of erecting sanitary homes at a reasonable rental for the wage-earner in the District. Miss Fletcher and Dr. La Flesche, members of this Society, also became stockholders and directors in the company. It is a pleasing recollection to all of us to know that the Society rendered an important sociological service in being instrumental in the creation of a company which since its establishment in 1897 has erected homes for 808 deserving families.

Mr. Hewitt, senior member of the scientific staff of the Bureau of American Ethnology, gave some "Reminiscences of Early Meetings." He spoke feelingly of the kindness and encouragement extended to him by Major Powell when he came to the Bureau of American Ethnology in 1886. He characterized Frank Hamilton Cushing and Jeremiah Curtin as, in his opinion,

two of the greatest mythologists of this country. They seemed to define the thoughts back of the myths of the American Indian, and I found their conclusions correct and very helpful. Washington Matthews, in his various papers, brought out a great many thoughts and ideas which harmonized with those with which I became acquainted among the Eastern Indians. Frank Hamilton Cushing used to come into my room, and he would talk for hours like a prophet. It was simply astounding to hear him retrace the development of Indian ideas.

Dr. Walter Hough, Head Curator of Anthropology of the U. S. National Museum, spoke of the relations that had obtained between the Society and that branch of the Smithsonian Institution. He considered that the National Museum had acted as a "culture medium" for the establishment of the Anthropological Society. The National Museum came into existence in 1878 as a separate branch of the Smithsonian Institution and the first person to handle its archaeological collections was Charles Rau, under whom studied Cushing and, to a certain extent, Professor Mason. Besides mentioning these men appreciatively, Dr. Hough paid tribute to James Stevenson, Matilda Coxe Stevenson, and Dr. Washington Matthews. He affirmed that "the foundation of the Anthropological Society did very much to stabilize science. Its effect was felt immediately. It was felt all over the world."

At this point the toastmaster rose to remark that although the name of Professor William H. Holmes was not on the program he was present and all would be much gratified to have a few words from him, and to the great pleasure of the company Professor Holmes complied.

Mr. Matthew W. Stirling, the new Chief of the Bureau of American Ethnology, replying for "The Bureau of Ethnology and the Society," called attention to the

fact that 1929 marked not merely the fiftieth anniversary of the Anthropological Society but the fiftieth anniversary as well of the Bureau and of the Cosmos Club, so that it was a red-letter year in the history not only of anthropology but of science in general. He then traced the history of the Bureau, which has contributed so much to the strength of the Society, noting Major J. W. Powell's early explorations beyond the southwestern frontier in 1867, the foundation of the Geological Survey, largely through his efforts, in 1871, his later interest in the Indians and their institutions, and the foundation of the Bureau of Ethnology, with Powell as Director in 1879. His early interest had already taken tangible form in another way in the publication of the eight volumes of *Contributions to North American Ethnology* by the Survey, and these were now followed by the long series of reports and bulletins of the Bureau of Ethnology, "the two now comprising a very large proportion of the contributions to the ethnological literature of America."

The men whom Major Powell was required to recruit for his staff, said the speaker,

> were medical men, missionaries, army men, men of the Coast Survey and men of the Geological Survey, whose interest had grown up because of a natural enthusiasm for and desire to understand the Indian. This was a self-generated interest, and the fact that it appeared before the study of ethnology had really become crystallized in this country, speaks not only for their versatility but for their genuine love of and interest in the Indian. Thus, while Major Powell had no college-trained anthropologists to draw on,—this being before the day of departments of anthropology in our universities—he was especially fortunate in having available this type of man, men who had had personal contact with the Indians and first-hand knowledge of them, in a day before the old customs had been badly shattered. Thus the subject of ethnology in America was placed on a very substantial basis. . . . .
>
> Speaking for the younger ethnologists, not only of the Bureau, but of the country at large, I think I echo the sentiments of all when I say that if we are but able to follow the inspiration and the far-seeing policies of the exceedingly able and capable men who have inaugurated this study, we shall have done all that is possible to perfect our knowledge of the American Indian.

Dr. L. O. Howard, for many years chief of the Bureau of Entomology, was called upon to discuss the problem of "Entomology versus Anthropology."[1] He said:

> I think that possibly, with the exception of Professor Holmes and myself, none of us here tonight was in Washington at the time of the founding of the Anthropological Society and the Cosmos Club, fifty years ago this month and last month. I knew practically all of the founders, and it is very difficult for me to speak to you without dropping into anecdotage—and I have not reached that age yet.

He then related some interesting and amusing experiences with certain early members of the Society, and, returning to the announced subject of his talk, continued:

> The subject of man versus insects is a different thing from entomology versus anthropology, and, just as hinted in the introduction, insects have had a tremendous influence on the progress of the human race and the rise and fall of civilizations.

place. I can see marching down through time the something that looks like man of the present day. I do not think we have all the connecting links, nor have we any phase of history complete.

It seems to me that it means that this thing that we call life, and the kind of being that we call man, each in its place, has had opportunity to go on building and building. I have no sympathy with those who feel that we are just building something to overshadow us and then die in it. In every age, through all time, the organism of human life has developed faster than the environment that has been built about itself. I cannot conceive of any scheme which would bring man to this particular stage and then fail to leave him the right to improve himself so as to keep ahead of the thing which he constructs.

A few weeks ago I suddenly discovered that the motto of the Carnegie Institution of Washington contains the words "research, discovery, investigation, and the application of knowledge, not just to the betterment of mankind, but to the improvement of mankind." I wondered whether the person who wrote it had in mind that a part of our business in this world is to see not only that we build around us, but that man himself has an opportunity for improvement.

There is a word that is used commonly these days that is spelled "eugenics." It is in a general way the idea that we have the right to be well-born. I conceive of it also as meaning that people have the right to be better and better born through the ages. Not less important than that which has come to all generations preceding us, the subject of eugenics must be considered from many points of view. We know something of the new Institute for Human Relations which is now being established at Yale University, a very great thing, the interrelation of studies that have to do with anthropoids, with the intimate structure and physiology of man, the relation of it all to laws of human conduct. It will not be possible to solve all the problems at Yale, nor do they expect to. They will not solve them all with that one institute, or in this century, but we are making a beginning, one of many beginnings of a study that has as its object this greater thing—the understanding of our capacity and the means of improvement of mankind in future generations.

As to human history, from my point of view, the most illuminating, the most comforting, the most stimulating idea that we secure from science comes out of that part of history which we find in the study of early man, the idea that man has tended to keep moving, to keep improving, to keep on developing his understanding of other creatures about him, and of himself.

I feel that eugenics in the strictly scientific sense is a portion of anthropology, and in reality is one of the great coming subjects, one which will help us to make man so much better that nothing he builds will ever overpower him. But the great stimulus, and the great hope to the eugenicists, it seems to me, comes from the broad, clear vision of what the anthropologists, together with the historians, have discovered in this picture of development of man as we see him coming up through the vast aeons of his early history.

Evanston Meeting of the Central Section

The Eighth Annual Meeting of the Central Section of the American Anthropological Association convened on May 10, 1929, at Evanston for a two-day session. Northwestern University acted as host, and all meetings were held in Harris Hall on the University grounds.

The program provided for morning and afternoon sessions on both May 10 and 11, and for an evening session on the 10th. In opening the convention Dr. Guthe,

Section President, introduced President Walter Dill Scott of the Northwestern University, who welcomed the members, dwelling at some length on the fact that the University grounds were Indian and pre-Indian as indicated by surface and other finds. In response, President Carl Guthe, of the University Museum, Department of Anthropology, Ann Arbor, complimented the Northwestern University upon possession of a Department of Anthropology.

In the first paper Paul Nesbit (University of Chicago) described "A recently discovered Aurignacian Skeleton from the North Sahara," giving the physical measurements, contrasting it with other finds, and submitting the skull itself for examination. The find was made at El Arbe, Algeria and was assigned to the late Aurignacian or early Magdalenian. In the discussion, participated in by many members, it was brought out that the Mediterraneans were in Africa long before they were in Europe, while the Cro-magnons, assumed to be present, as they were at Gibraltar, were not.

Dr. George L. Collie (Beloit College, Beloit, Wis.) gave "A Comparison of the Upper Paleolithic of Algeria with that of France," stressing the dissimilarities and also the presence of engraved shells of ostrich eggs found in African sites.

The paper of Dr. Albert A. Reagan (Ouray, Utah) on "Plants used by the White Mountain Apache of Arizona," was read by title.

In "A New Stone Age Culture from Northern Labrador," Dr. William D. Strong (Field Museum, Chicago) gave the result of certain discoveries made in Labrador during a recent expedition into this region. The difficulties of discovering artifacts on likely sites due to the depth of moss growth prevented any great number of finds. He was inclined to place the culture as proto-Algonquin or possibly proto-Eskimoan.

Dr. Carl Guthe (University of Michigan) spoke on "Human History Museums." At some length he outlined methods and purposes, and described the effects produced by visits he had made during the past year to a great number of museums in the Middle West.

At the beginning of the afternoon session President Guthe announced committee appointments as follows:—Nominating Committee: Dr. Fay Cooper-Cole (Chairman), Dr. Charles R. Keyes, and Director E. K. Putnam; Resolutions Committee: Robert Redfield (Chairman), Dr. W. D. Strong, and Julian Steward; Auditing Committee: Henry Field, (Chairman), P. E. Cox, and H. C. Shetrone.

Seven papers were submitted, Henry Field (Field Museum) in an illustrated talk on "Paleolithic and Neolithic Man in the North Arabian Desert," gave the results of an extensive survey during the past year and summarized observations covering several years of work.

Wilton Marion Krogman (Western Reserve University, Cleveland) presented his own and his fellow-workers' observations on "The Problem of Growth Changes in the Skull and Face." With many diagrams he showed where the growth has been found to take place, and at what periods, as deduced from the study of many skulls of orangs, chimpanzees and gorillas.

F. E. Wood (Field Museum) spoke on "Some Effects of Deformation on the Cranial Measurements of Peruvian Skulls." Also, by the aid of diagrams, he pointed out the two types of skull produced by deformation, and concluded that deformation makes almost no changes in relative measurements.

George Neuman (University of Chicago) spoke on "Further Researches on Hair." Some new and interesting conclusions have been adduced since the report made at the Chicago meeting. Control groups now are being established and some odd facts brought to light, such as the presence on the head of a single person of five percent of Negroid hair, with the balance Caucasoid.

In "Mankala, a Study of Trait Distribution," Maurice Mook (Northwestern University) discussed the wide range of this game in Africa and other parts of the world. He also described the variants.

Dr. M. J. Herskovits (Northwestern University), in "Proverbs of the Kru People of Liberia, a Study in Method," quoted from a vast store of sayings he had collected and explained that often they mean something totally different from their literal significance.

Dr. S. A. Barrett, Director of the Milwaukee Public Museum, who had recently returned from nearly a year's collecting trip in Africa, spoke on "Notes on the Natives of Africa," illustrated by some excellent slides.

A dinner to visiting members and their friends was tendered by the Northwestern University at the North Shore Hotel.

At the evening session two illustrated papers were presented. Huron H. Smith, Curator of Botany at the Public Museum, Milwaukee, discussed the "Ethnobotany of the Winnebago Indians," treating not only the uses of plants, but also native customs; several Winnebago songs were sung.

Geo. A. West, President of the Board of Directors of the Public Museum, reported on "The Isle Royale Archeological Expedition." The difficulties encountered and results achieved were brought home by a series of slides, supplemented by motion pictures.

On Saturday morning the session was resumed at 9:30. H. C. Shetrone, Director of the State Museum of Columbus, Ohio, opened with "Some New Phases of the Hopewell Mound Culture," stressing the discoveries that are extending this cultural province to embrace nine, possibly ten, states. He gave the main characteristics of culture as including, among others: the building of mounds, rings, circles, walls, etc., some mounds having an earthen floor; the cremation of the dead, or enclosing and extending the body in a log tomb; use of copper for ear-spools, helmets, or head ornaments, breast plates, etc.; use of woven fabrics; pottery, marked by roulette and by cross-hatch, also with conventionalized birds; use of mica and quartz; platform pipes; bone and shell etched and engraved in repoussé work.

Frank M. Setzler of the Indiana Archeological Survey gave "A Preliminary Report on the Archeology of Indiana." He told of a survey in Frankfort County, where twelve stone mounds were investigated and fifty-seven earthen mounds found and definitely located.

In the "Algonquian in Iowa" Dr. Charles R. Keyes, Director of the Iowa State Archeological Survey, presented various evidences of this culture in his state. He reported the finding of many new linear mounds in the central part of Iowa.

"Report on Explorations of the Old Stone Fort at Manchester, Tennessee," by P. E. Cox, Tennessee State Archeologist, showed that notwithstanding a rather thorough survey of the walls, gates, and interior, the Fort remains largely a mystery.

"Cartographic Symbols for Archeological Survey Maps," was read by the Secretary in absence of the author, Chas. E. Brown, Chief of the Wisconsin Historical Society Museum, Madison, Wis. It was a plea for a more thorough and revised symbolization for use with state and other maps.

Dr. W. B. Hinsdale (Museum of Anthropology, Ann Arbor Michigan) in "Maps—New and Old—of the Great Lakes Region," showed portions of the new state archeological atlas now in course of preparation by Secretary Ed. J. Stevens, of the Michigan State Archeological Association. These maps will locate all the major archeological features now known to archeologists of Michigan.

The final and afternoon session was begun with the annual business meeting. It was moved by Dr. Cole and seconded by Dr. Herskovits that the reading of the minutes of the 1928 meeting be dispensed with. The motion prevailed.

The Secretary's Report showed that since the 1928 meeting at Beloit one member had died, two had resigned, one had exchanged, and nine (of whom two were Associate members) had been dropped for non-payment of dues, leaving 61 active and 19 associate members. Since the 1928 meeting 11 active and 10 associate members have been added, making the actives 72 and the associates 29, a total of 101.

The Secretary reported mailing 379 letters, etc., and presented a bill for postage, $7.66, and for telephone calls, $2.00, a total of $9.66. The report was accepted.

The Treasurer's Report showed:

Cash as per the 1928 report	$ 86.94		
Dues collected up to May 10, 1929	485.00		
3 1928 members at $6.00 and one at $1.00	19.00		
	$590.94		$590.94
Expenses. Printing		$ 16.75	
Dues sent A.A.A.		345.00	
Total		$361.75	361.75
Balance as shown and agreeing with cash in the E. K. Warren and Co. Bank at Three Oaks			$229.19
Checks drawn and not paid on May 10			
Programs		$ 11.65	
Postage and Telephone		9.66	
Due Ethnological Soc. 5 Members		5.00	
Due A.A.A. on 6 members		30.00	
Total		$ 56.31	56.31
Balance			$172.88

Due from A.A.A.	$ 1.00	
Due from Actives	18.00	
Due from Associates	18.00	
	$ 37.00	37.00
Resources, Central Section		$209.88

Submitted by
GEO. R. FOX, *Treasurer*

The Auditing Committee then reported that they had examined the accounts of the Treasurer and found that the books balanced. It was moved by chairman Field that the report be accepted; seconded by Dr. Cole; the motion was carried.

The Nominating Committee reported as follows:

For President, Ralph Linton, of Madison, Wis.;

For First Vice President, H. C. Shetrone of Columbus, Ohio;

For Second Vice President, Henry Field, of Chicago, Ill.;

For Secretary-Treasurer, Geo. R. Fox, of Three Oaks, Mich.;

For members of the Executive Committee, E. T. Olmstead, of Urbana, Ill., Robert Redfield, Chicago, Ill., E. K. Putnam, Davenport, Iowa, Kimball Young, Madison, Wis., J. E. Pearce, Austin Texas.

Dr. Cole moved that the report be accepted and the Secretary be instructed to cast a unanimous ballot for each of the nominees for the several offices. This was seconded by Dr. Hinsdale and the motion was carried. The Secretary cast such ballots, and the various officers were declared elected.

The Resolution Committee reported two resolutions both of which were adopted:

Be it resolved by the Central Section of the AMERICAN ANTHROPOLOGICAL ASSOCIATION that this body deeply regrets the death, on January 28, 1929, of John M. Wulfing of St. Louis. One of the organizing members of the Section, he remained always a loyal and helpful associate. His anthropological interests, never narrow, took in the period before his death the special form of an interest in the development of archeological research in Missouri.

We recommend that a copy of this resolution be sent to Mr. Wulfing's family.

Be it resolved by the Central Section of the AMERICAN ANTHROPOLOGICAL ASSOCIATION that, recognizing the effort expended in preparation for this meeting and experiencing the warm hospitality which has met the members in Evanston, the hearty thanks of the Section are extended to Northwestern University, to President Scott, and to Professor Herskovits and his associates, for the courteous provisions which have given to this scientific meeting the added character of a gathering of congenial guests in the house of a generous host.

In bringing up the place of the 1930 meeting P. E. Cox tendered so eloquent an invitation to meet at Nashville, Tennessee, that E. K. Putnam stated he had planned to invite the Section to Davenport but would defer it in view of Mr. Cox's invitation. An invitation from Mr. West and Dr. Barrett to meet in Milwaukee also was received.

It was moved by H. C. Shetrone and seconded by Dr. Cole that the selection of the 1930 meeting-place be left in the hands of the Executive Board. Motion carried.

Moved by W. D. Strong and seconded by Henry Field that the Business session be adjourned. The motion was carried.

Four papers were presented. Dr Ralph Linton described "Megalithic Monuments of Madagascar." Mr. Linton found these still being erected, and told of methods and means; he also described the giant tombs which seem to have been constructed only within the last few centuries.

Mrs. Janet Montgomery McGovern's "Among the Headhunting Tribes of Formosa," was illustrated by a fine set of slides and many samples of the work of these people. She described their characters and culture planes, and gave the classifications of the various tribal units.

Dr. William M. McGovern's talk likewise was illustrated with slides. He spoke on "The Ethnology of Thibet," and traced the paths Buddhism took in entering the land.

Henry Field reported on the latest finds by the "Field Museum-Oxford University Expedition; Excavations at Kish, Mesopotamia." He described the finding of the four-wheeled chariot, the oldest wheeled vehicle yet discovered. In the very lowest levels of the excavations, where water comes in faster than it can be baled out, a new culture, as yet little known, was found.

ANTHROPOLOGICAL NOTES AND NEWS

DR. WALTER LEHMANN, director of the Museum of Ethnology at Berlin, and Professor Konrad Theodor Preuss have been elected honorary members of the Anthropological Society of Washington.—*Science*. Dr. Lehmann recently gave a series of lectures on ancient Mexican religions at the University of Buenos Aires.

DR. MILO HELLMAN has resigned his position at the College of Dentistry, New York University, to devote his time to more intensive research on problems of odontology and the development of the human face.

PROFESSOR A. L. KROEBER spent nine weeks among the Walapai in northwestern Arizona, where he took part in the first anthropological summer school sponsored by the John D. Rockefeller, Jr., anthropological field station soon to be established at Santa Fé, New Mexico. Under the same auspices linguistic work among the Navaho was superintended by Professor E. Sapir and archaeological research in New Mexico by Dr. A. V. Kidder. Mr. Rockefeller has set aside $200,000 for the erection of an anthropological field laboratory to serve the same purpose in ethnology, as do in zoology such laboratories as that at Woods Hole, Massachusetts, and the California Scripps Institution of Oceanography at La Jolla. It will be an open house for the use of ethnologists from all parts of the world. It is hoped that the station will sponsor summer courses for graduate students every year, as it did this season.

HURON H. SMITH, botanist at the Milwaukee Museum, spent three months on the Oneida Indian reservation near Green Bay, Wisconsin, studying the aboriginal uses of plants. This is the sixth and last study to be made of the six Wisconsin Indian tribes, Menominee, Chippewa, Fox, Pottawatomi, Winnebago, and Oneida.

THE AMERICAN SCHOOL of Prehistoric Research, of which Dr. George Grant MacCurdy of Yale University is Director, will coöperate with the British School of Archaeology at Jerusalem next April, May and June in excavating three caves at the foot of Mount Carmel, near Athlit, Palestine. Dr. MacCurdy returned to New Haven on October 1 after conducting the ninth summer term of the School in selected portions of England, France and Spain. About half the term was devoted to excavating a rock shelter in Dordogne. Students attending the tenth summer term beginning the first of July, 1930, will have an opportunity to excavate not only in the Dordogne, but also in Spain.

MISS CATON-THOMPSON'S excavations in Rhodesia on behalf of the British Association corroborate Randall-MacIver's interpretation of the Zimbabwe ruins as essentially of indigenous origin and not antedating the mediaeval period. Alien beads from India and Malaysia permit chronological determination and suggest such dates as A.D. 900 and A.D. 600–1100. *Nature* (Sept. 7, 1929).

PROFESSOR H. F. CLELAND, of Williams College, is spending the first semester of the college year in California.

THE HERBERT SPENCER lecture was delivered at the University of Oxford on May 15, 1929, by Dr. Charles S. Myers, under the title of "Psychological Conceptions in other Sciences."

HARLAN I. SMITH, archaeologist of the National Museum of Canada, has been making still and motion pictures of the Indian life and archaeological subjects in the Coast Salish, Nootka, and Kwakiutl areas. *Museum News.*

A LECTURE was recently delivered by Doctor Cipriani, Professor of Ethnology at the Royal University of Florence, on the characteristics of the Bantu, which he interpreted as strongly presumptive of Semitic and Bushman origin. Doctor Cipriani was the anthropologist of the Italian expedition formed to study the Bantu problem. The researches were carried out partly in Asia and partly in Africa. Doctor Cipriani, at the time of his lecture, was planning to go to the Kalahari Desert to study living Bushmen.

DR. WILHELM KOPPERS, the editor of *Anthropos*, has founded a special Institute of Ethnography in Vienna. It is located in a wing of the New Imperial Palace, the same building which is to house the new Museum of Ethnography.

DOCTOR MARGARET MEAD of the American Museum of Natural History and Mr. Reo Fortune returned to this country in September, 1929, after a year's field work in the Admiralty Islands. Doctor Mead, under the auspices of the Social Science Research Council, was investigating the development of young children while Mr. Fortune devoted himself to a general ethnographic study of these people.

DR. ALEŠ HRDLIČKA left Washington for the summer to conduct his second expedition to Alaska, taking with him as assistant Dr. Maly, of Prague.

AT THE MEETING of the British Association for the Advancement of Science, held in Cape Town, the South Africa Research medal, was presented to Dr. Robert Broom for his archaeological and anthropological researches.

DR. E. B. RENAUD, professor of Anthropology at the University of Denver, conducted a two months' expedition for the Colorado Museum of Natural History. Reconnaissance trips and a general archaeological survey covered the vast region between the Purgatoire River in Colorado to the Canadian River near Tucumcari in New Mexico; the Raton-Las Vegas road, and the Texas line. Intensive exploration was concentrated in the Dry Cimarron valley, the principal result being the discovery of cultural and human remains of a primitive form of Basket Maker culture in caves located near Kenton, Oklahoma, and Folsom, New Mexico. This extends greatly to the northeast the culture area of distribution of that prehistoric culture. After the Pecos Conference Dr. Renaud, in the company of Dr. H. S. Colton of Flagstaff, undertook another archaeological trip to study the extension and contacts of the Mesa Verde and Kayenta cultures. About thirty sites were visited, some of them not previously reported.

DOCTOR GUDMUND HATT, once a student at Columbia University and known as an investigator of Lapp culture and as the author of distributional inquiries, has been appointed professor extraordinarius of cultural geography at the University of Copenhagen.

THE TEXAS ARCHAEOLOGICAL and Paleontological Society of Abilene, Texas has published a bulletin containing an article by Doctor Cyrus N. Ray on "A Differentiation of the Prehistoric Cultures of the Abilene Section," a paper by Rupert Richardson on "The Culture of the Comanche Indians," and several other contributions.

Social Science Research Council

The Social Science Research Council announces its second annual list of Grants-in-Aid. Altogether, thirty-seven scholars received support. On the basis of major emphasis, their projects were distributed among the social sciences as follows: Anthropology 2, Economics 6, History 16, Political Science 2, Psychology 4, Sociology 5, Human Geography 2. Most of the projects, needless to say, straddle a number of these fields. In fact, while not insisting upon it, those administering Grants-in-Aid look with favor upon projects that represent a broader approach to a problem than is possible within the limits of any one discipline.

The Grants-in-Aid of special interest to our readers are:

Leslie A. White (University of Buffalo)

Project: "The Securing of All Ethnological Data Possible from Santa Domingo, San Filipe, Zia Sant-Ana, and Sandia Pueblos"

Benjamin Lee Whorf

Project: "Translation of Aztec Manuscripts Relating to History of Toltec Period, Preparation of Aztec Grammar and Root-vocabulary, and of Works Relating to the Structure of the Nahuatl Language and the Connection of Nahuatl with the Piman Languages, with Study of Modern Spoken Nahuatl in Mexico, Recording of Spoken Nahuatl, and the Study of the Relation of Nahuatlan Linguistics to the Antiquities, the Hieroglyphs and the Investigation of the Ancient Middle American Civilization and Related Problems"

The aid granted by the Council ranges from $200 to $2000, and in almost every case is conditional upon liberal cooperation from the institution with which the applicant is connected.

The administration of Grants-in-Aid is in the hands of a special Committee of the Council known as the Committee on Grants-in-Aid. The Committee plans to hold two meetings during the coming academic year: in mid-November and in mid-March. The closing date for receiving applications for consideration at the latter meeting is February 1, 1930. Any scholar who is a resident of the United States or Canada and who has evidenced real research ability is eligible. The Committee expects that the applicant's project will be well under way, that he can forecast the time and the money required to complete it, that it is not to be used in fulfillment of any higher academic degree, and that he has already canvassed carefully the possibility of aid from his own institution. Applications should be addressed to Walter R. Sharp, Secretary of the Committee on Grants-in-Aid of the Social Science Research Council, 230 Park Avenue, New York City.

A Statement dated Sept. 11, 1929 announces the appointement of Robert S. Lynd as permanent secretary of the Social Science Research Council.

The Social Science Research Council has elected the following members under the recently created classification of Members-at-Large: Professor Henry M. Bates, Dean of the Law School of the University of Michigan; Dr. Adolf Meyer, Professor of Psychiatry and Director, Henry Phipps Psychiatric Clinic, Johns Hopkins University; Dr. C. E. A. Winslow, Graduate School Chairman, Professor of Public Health, Yale University; and Professor Robert S. Woodworth, Department of Psychology, Columbia University.